

# Heart of Glass-Δ6

Lab 5b-Color Wheel 2-Individual

# Heart of Glass

Original  
070922-1

|                  |       |
|------------------|-------|
| Neph Sy          | 39.82 |
| Whiting          | 14.16 |
| Zinc Oxide       | 12.39 |
| EPK              | 8.94  |
| Flint            | 22.71 |
| Bentonite        | 1.98  |
| Copper Carbonate | 0.99  |
| Water            | 75    |



1-3 Second Dip



2-3 Second Dips

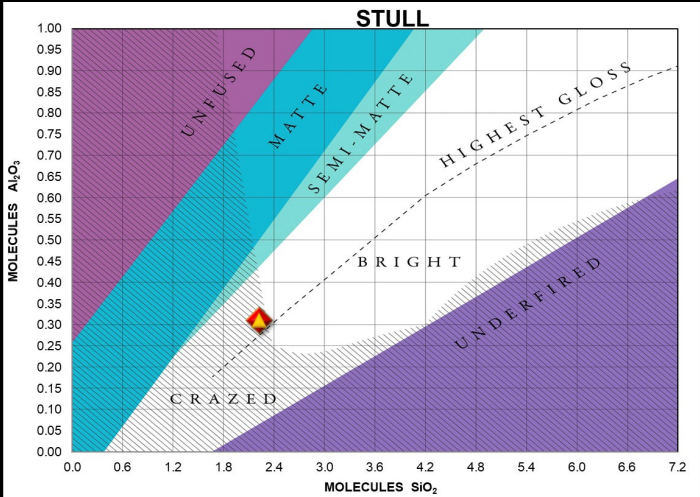


Reduction



UMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.22          |                          | Alkaline Earths<br>0.78 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.27                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.32 | Na <sub>2</sub> O<br>0.17      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.37 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.32               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.39             | FeO<br>0.01 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



EUMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.24          |                          | Alkaline Earths<br>0.76 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.23                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.31 | Na <sub>2</sub> O<br>0.17      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.37 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.31               | Li <sub>2</sub> O              | CuO<br>0.02              | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.39             | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |

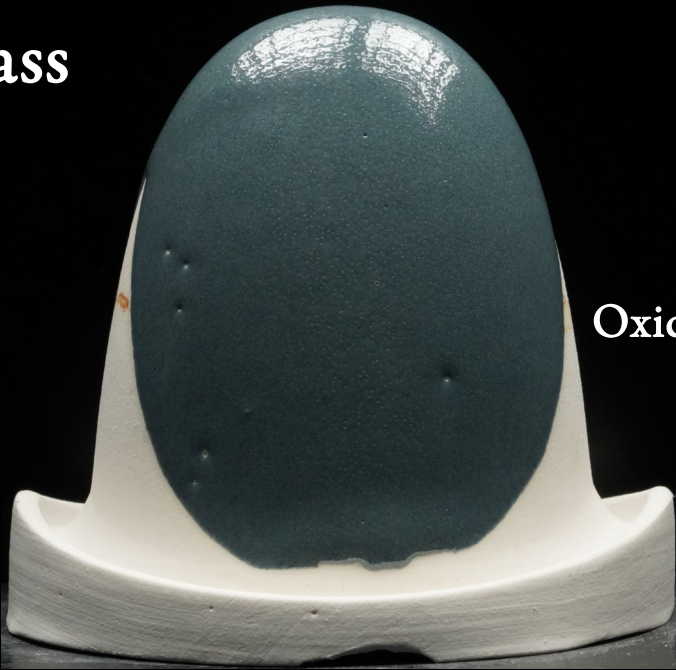


Ceramic  
Materials  
Workshop

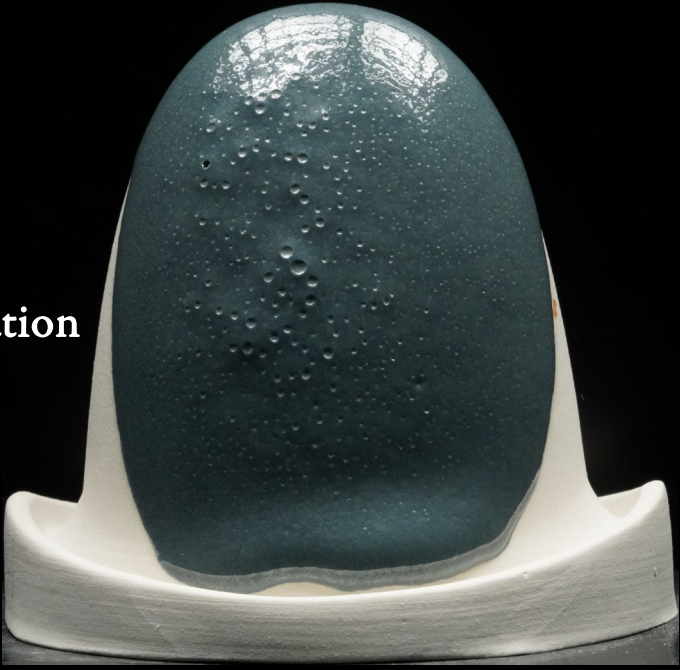


# Heart of Glass

|                  |       |
|------------------|-------|
| Neph Sy          | 39.04 |
| Whiting          | 13.88 |
| Zinc Oxide       | 12.15 |
| EPK              | 8.76  |
| Flint            | 22.26 |
| Bentonite        | 1.94  |
| Cobalt Carbonate | 0.98  |
| Chrome Oxide     | 0.98  |
| Water            | 60    |



1-3 Second Dip



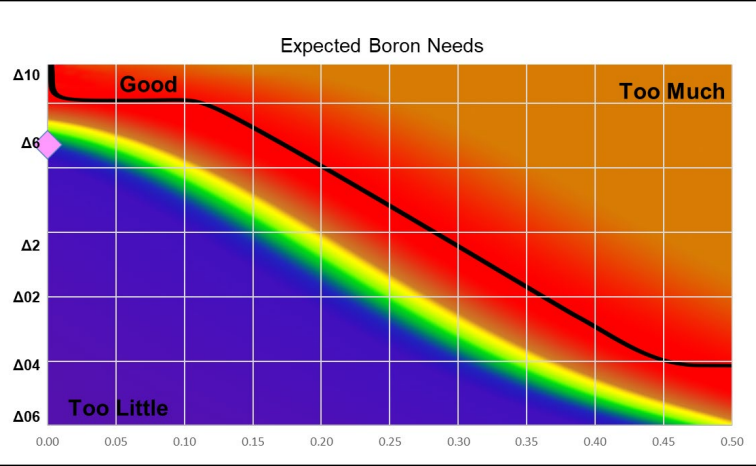
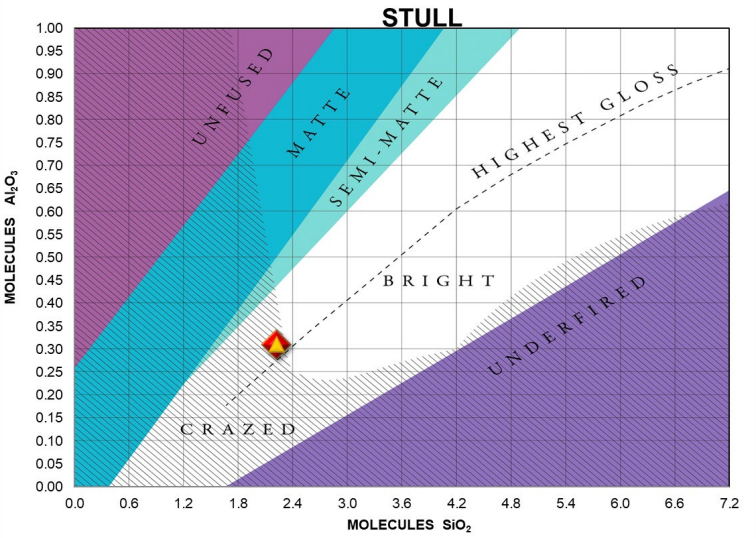
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.22          |                          | Alkaline Earths<br>0.78 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.22                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.31 | Na <sub>2</sub> O<br>0.17      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.37 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.31               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.39             | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.02                             | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO<br>0.02 |

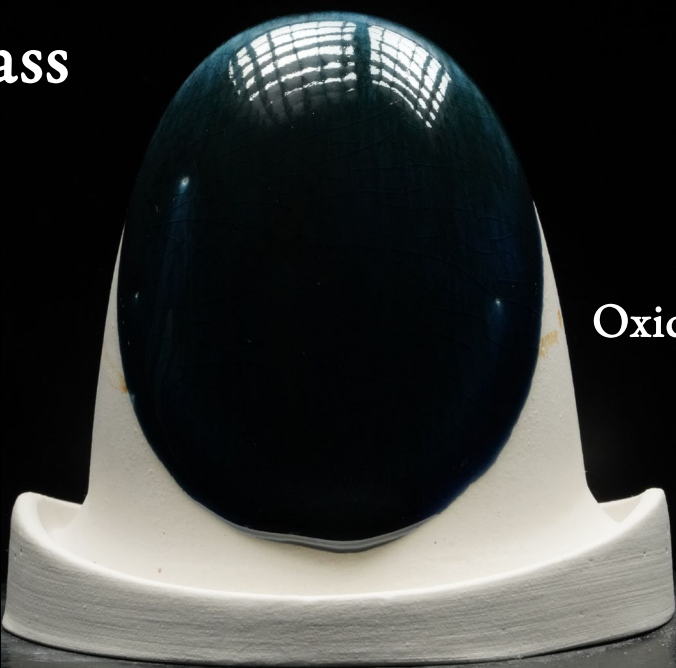


Ceramic  
Materials  
Workshop



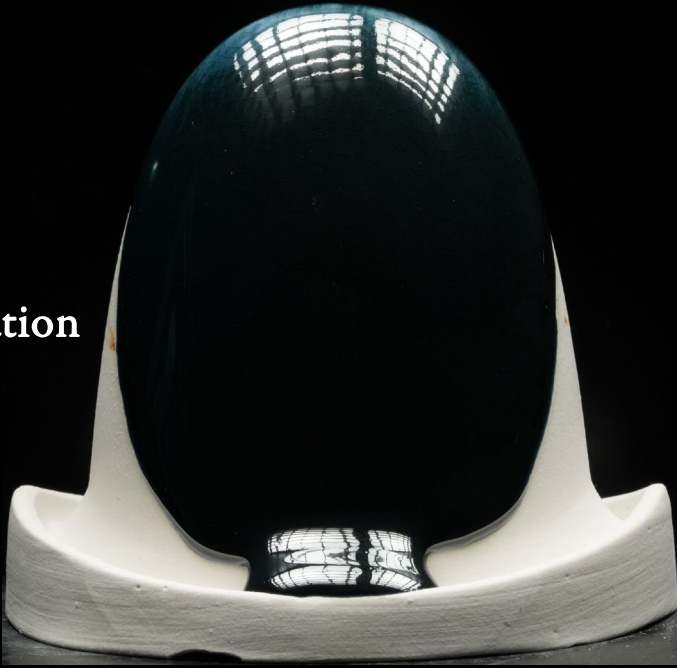
# Heart of Glass

|                  |       |
|------------------|-------|
| Neph Sy          | 38.29 |
| Whiting          | 13.62 |
| Zinc Oxide       | 11.91 |
| EPK              | 8.59  |
| Flint            | 21.84 |
| Bentonite        | 1.90  |
| Cobalt Carbonate | 0.96  |
| Copper Carbonate | 2.88  |
| Water            | 60    |



Oxidation

1-3 Second Dip

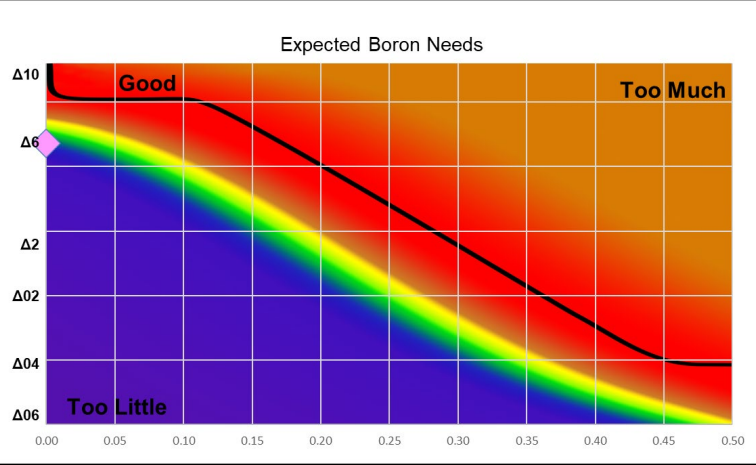
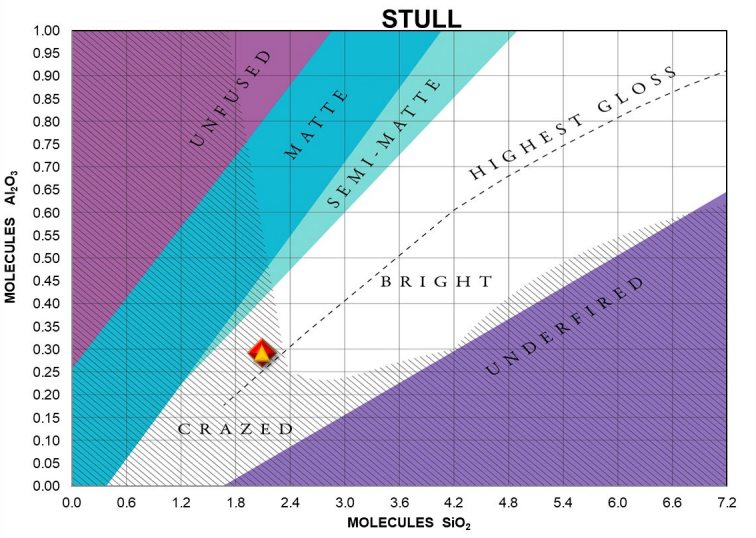


2-3 Second Dips



Reduction

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.26          |                          | Alkaline Earths<br>0.74 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.09                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.29 | Na <sub>2</sub> O<br>0.16      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.34 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.29               | Li <sub>2</sub> O              | CuO<br>0.06              | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.36             | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO<br>0.02 |

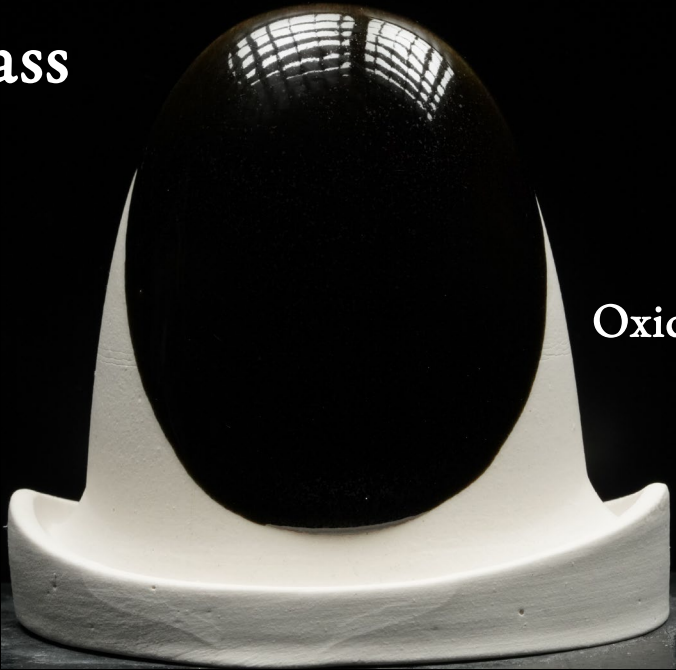


Ceramic  
Materials  
Workshop

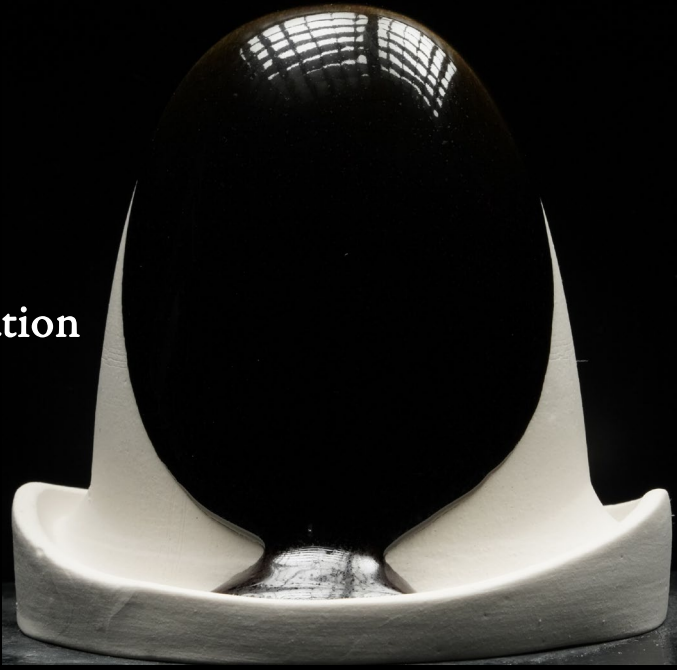


# Heart of Glass

|                  |       |
|------------------|-------|
| Neph Sy          | 37.22 |
| Whiting          | 13.23 |
| Zinc Oxide       | 11.58 |
| EPK              | 8.35  |
| Flint            | 21.22 |
| Bentonite        | 1.85  |
| Cobalt Carbonate | 0.93  |
| Red Iron Oxide   | 5.61  |
| Water            | 65    |

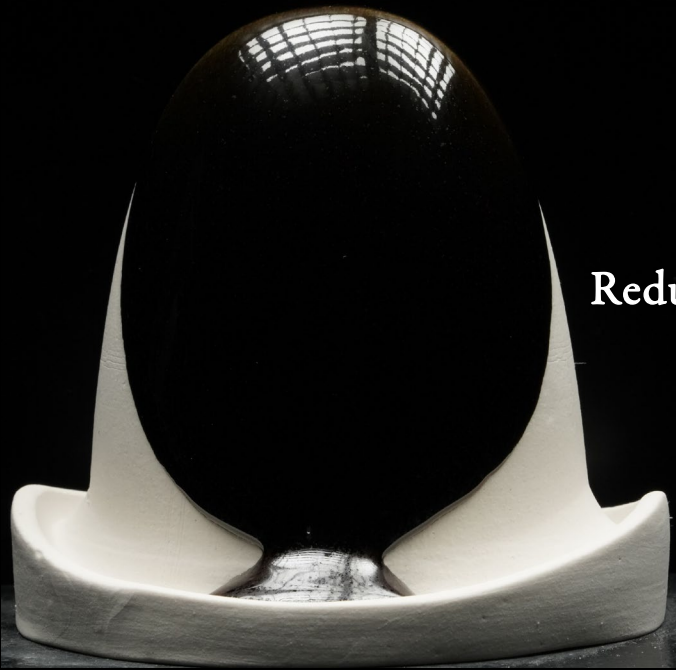


Oxidation



1-3 Second Dip

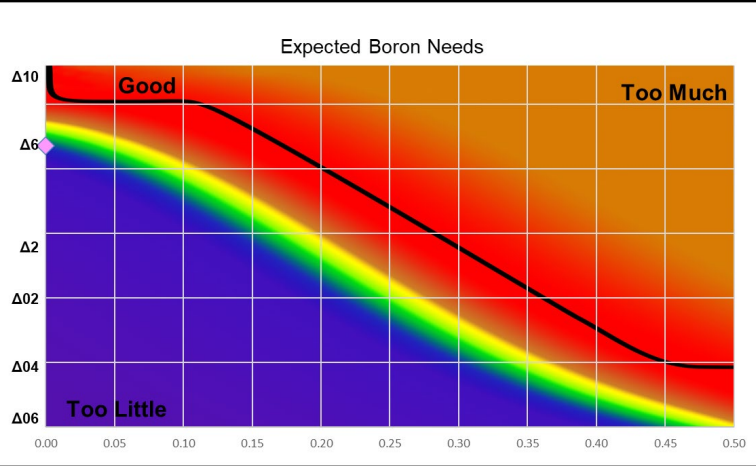
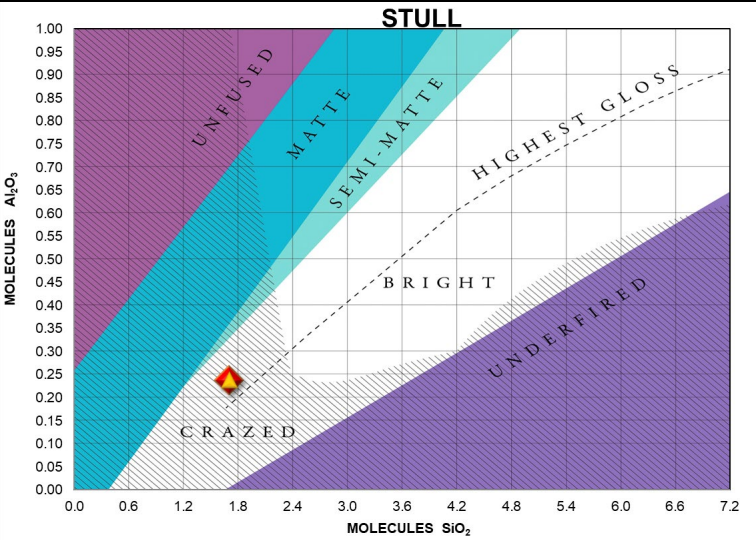
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.71                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.24 | Na <sub>2</sub> O<br>0.13      | K <sub>2</sub> O<br>0.04 | MgO<br>0.00             | CaO<br>0.28 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.24               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.30             | FeO<br>0.24 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO<br>0.02 |

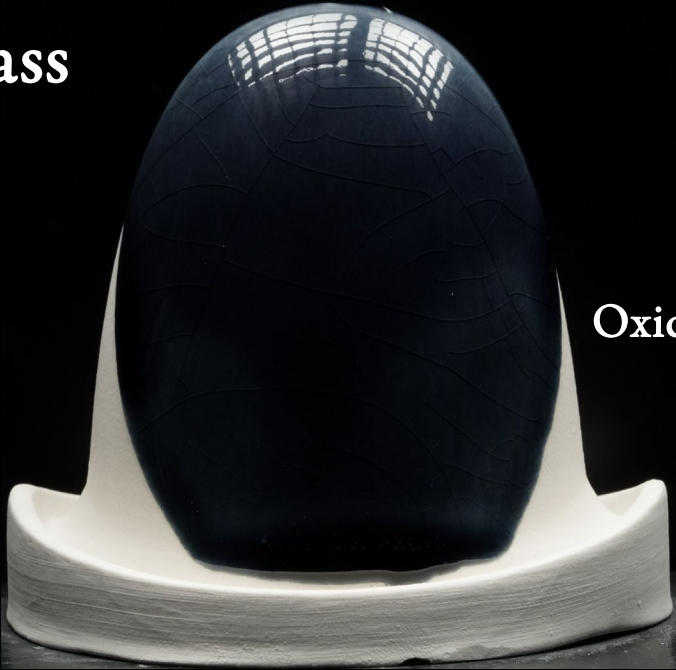


Ceramic  
Materials  
Workshop



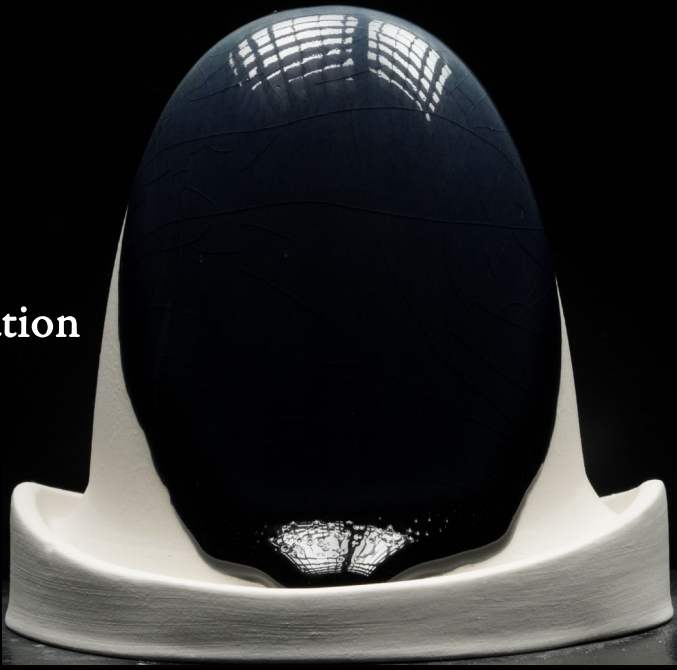
# Heart of Glass

|                   |       |
|-------------------|-------|
| Neph Sy           | 38.29 |
| Whiting           | 13.62 |
| Zinc Oxide        | 11.91 |
| EPK               | 8.59  |
| Flint             | 21.84 |
| Bentonite         | 1.90  |
| Cobalt Carbonate  | 0.96  |
| Manganese Dioxide | 2.88  |
| Water             | 65    |



Oxidation

1-3 Second Dip

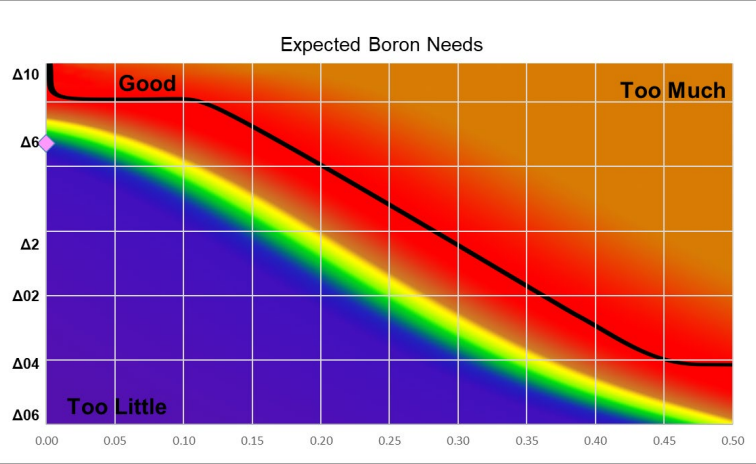
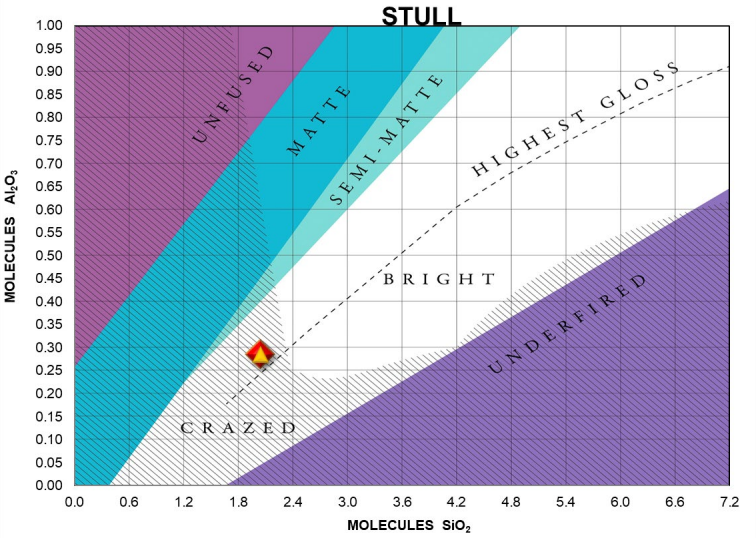


2-3 Second Dips



Reduction

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.20          |                          | Alkaline Earths<br>0.80  |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|--------------------------|-------------|
| SiO <sub>2</sub><br>2.04                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.29 | Na <sub>2</sub> O<br>0.16      | K <sub>2</sub> O<br>0.04 | MgO<br>0.00              | CaO<br>0.34 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.29               | Li <sub>2</sub> O              | CuO                      | SrO                      | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.35              | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub><br>0.08 | CoO<br>0.02 |

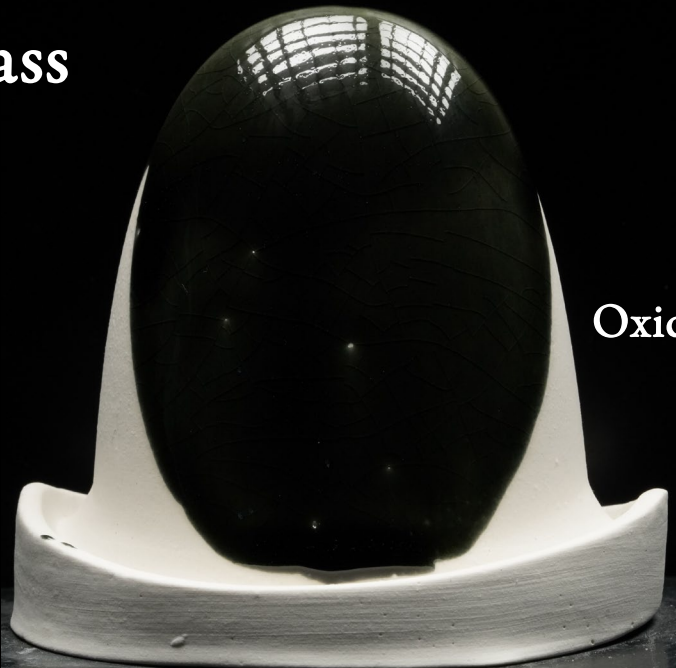


Ceramic  
Materials  
Workshop



# Heart of Glass

|                     |       |
|---------------------|-------|
| Neph Sy             | 38.48 |
| Whiting             | 13.68 |
| Zinc Oxide          | 11.97 |
| EPK                 | 8.64  |
| Flint               | 21.94 |
| Bentonite           | 1.91  |
| Cobalt Carbonate    | 0.97  |
| Nickel Carb (Green) | 2.42  |
| Water               | 60    |



1-3 Second Dip



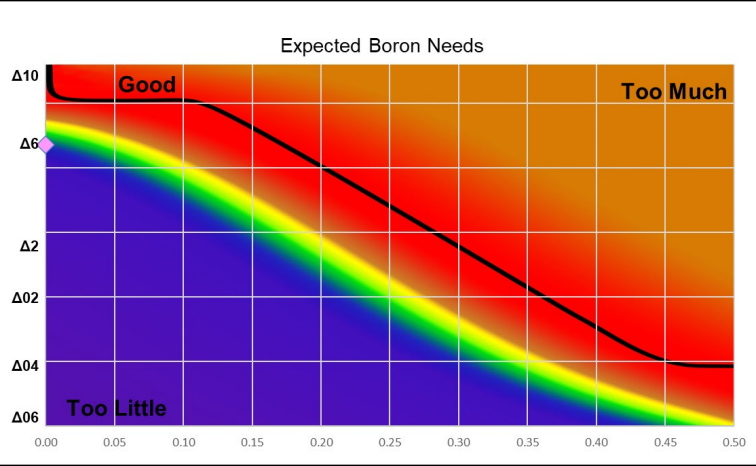
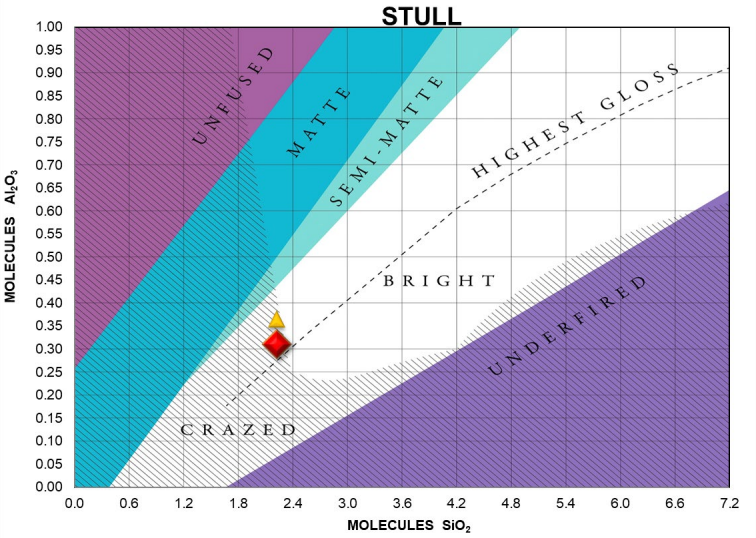
2-3 Second Dips



Oxidation

Reduction

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>6.09 : 1 |                                                      | Alkali Metals<br>0.22          |                          | Alkaline Earths<br>0.78 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.22                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.36 | Na <sub>2</sub> O<br>0.17      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.37 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.31               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO<br>0.05                                          | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.39             | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO<br>0.02 |

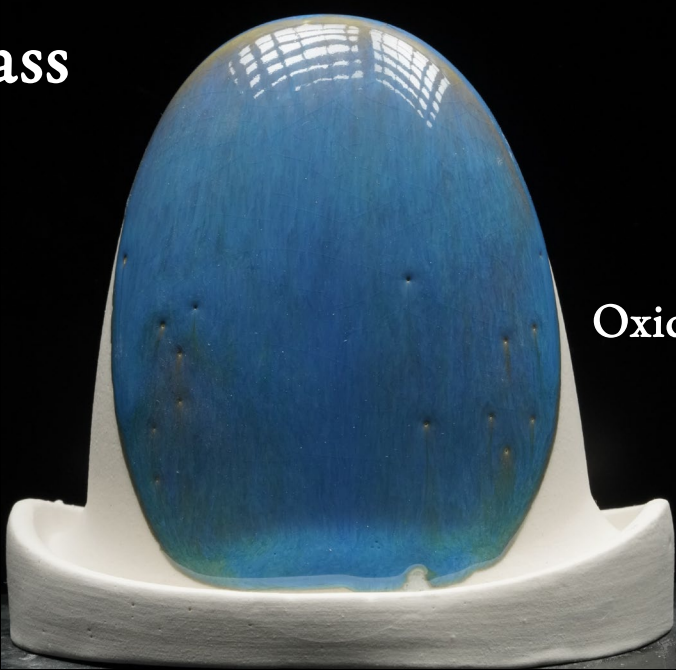


Ceramic  
Materials  
Workshop

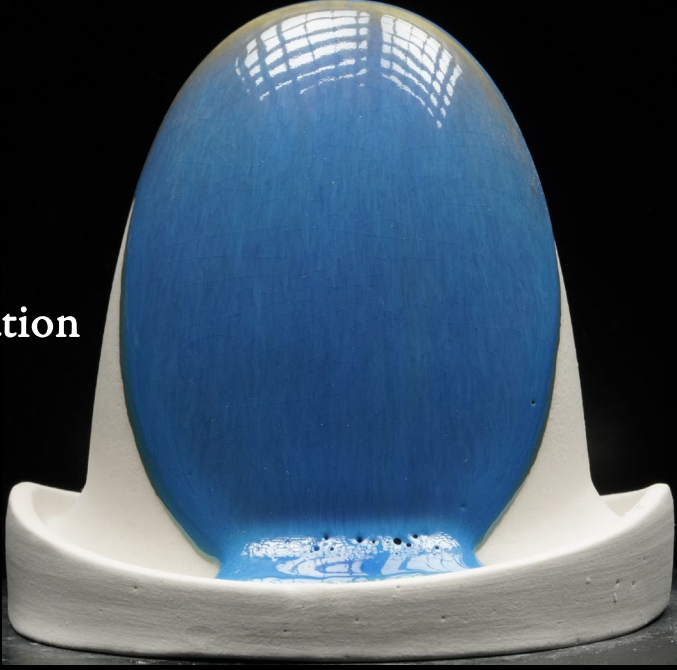


# Heart of Glass

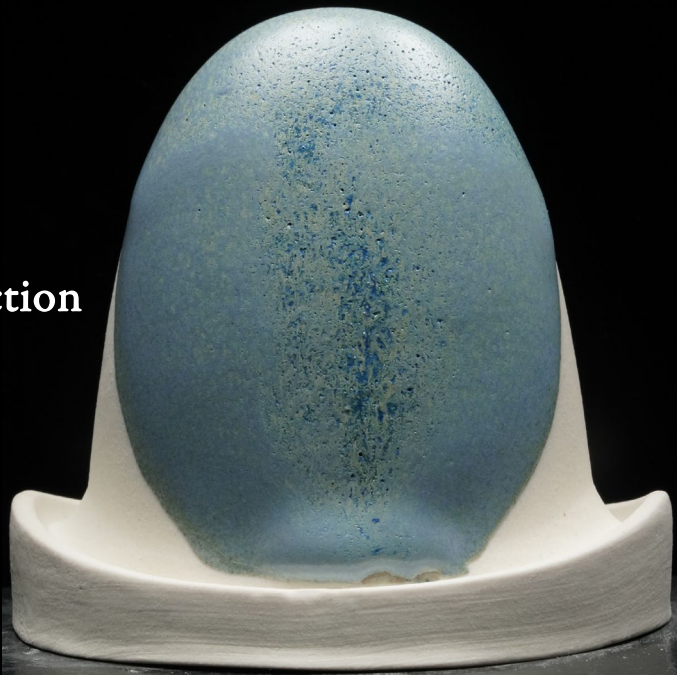
|                  |       |
|------------------|-------|
| Neph Sy          | 37.22 |
| Whiting          | 13.23 |
| Zinc Oxide       | 11.58 |
| EPK              | 8.35  |
| Flint            | 21.22 |
| Bentonite        | 1.85  |
| Cobalt Carbonate | 0.93  |
| Titanium Dioxide | 5.61  |
| Water            | 65    |



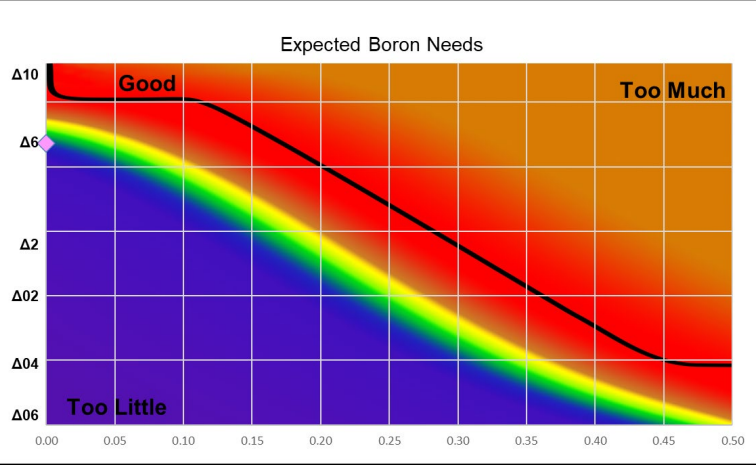
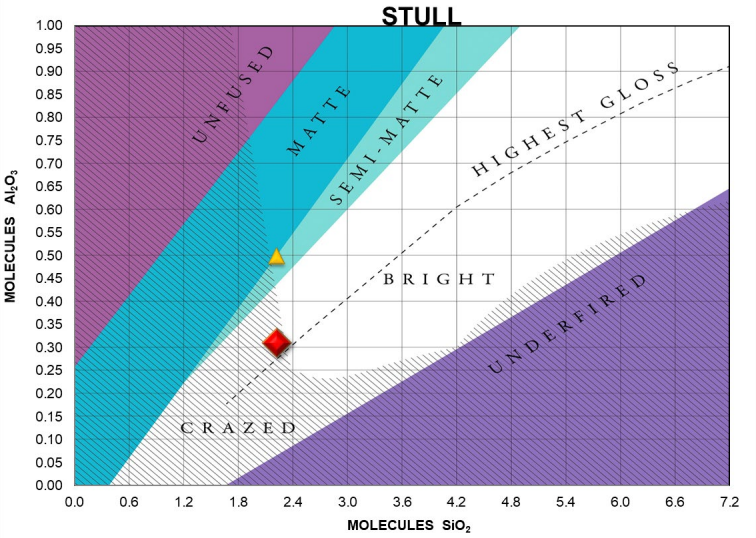
Oxidation



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>4.45 : 1 |                                                      | Alkali Metals<br>0.22          |                          | Alkaline Earths<br>0.78 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.22                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.50 | Na <sub>2</sub> O<br>0.17      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.37 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.31               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.19                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.39             | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO<br>0.02 |

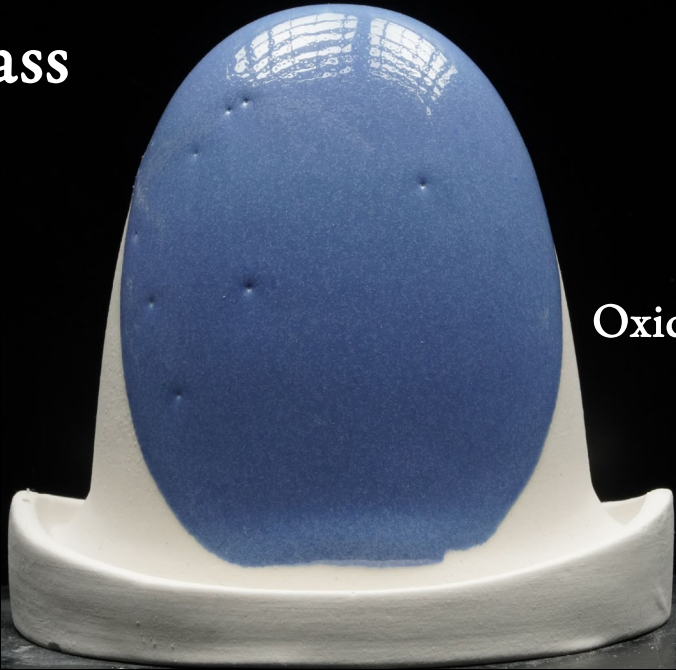


Ceramic  
Materials  
Workshop

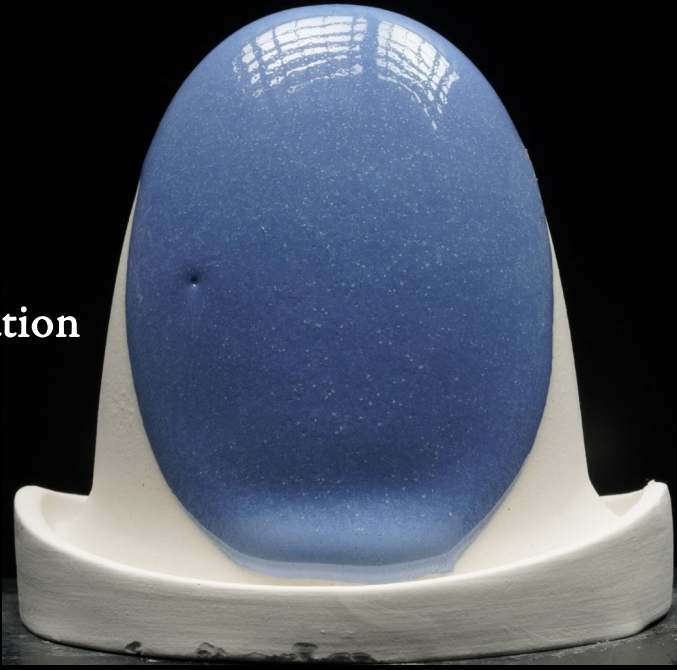


# Heart of Glass

|                  |       |
|------------------|-------|
| Neph Sy          | 37.57 |
| Whiting          | 13.36 |
| Zinc Oxide       | 11.69 |
| EPK              | 8.43  |
| Flint            | 21.42 |
| Bentonite        | 1.87  |
| Cobalt Carbonate | 0.94  |
| Tin Oxide        | 4.72  |
| Water            | 65    |



1-3 Second Dip



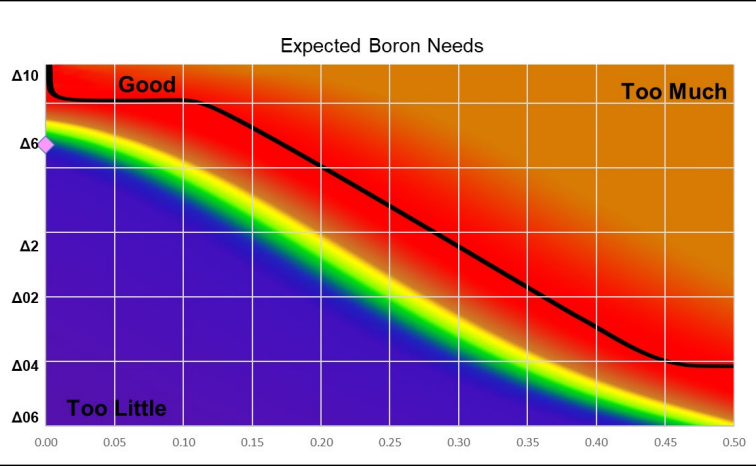
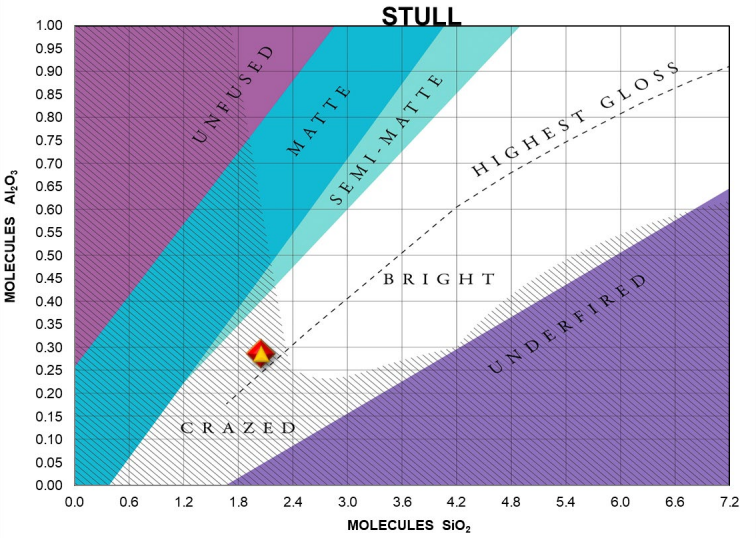
2-3 Second Dips



Reduction



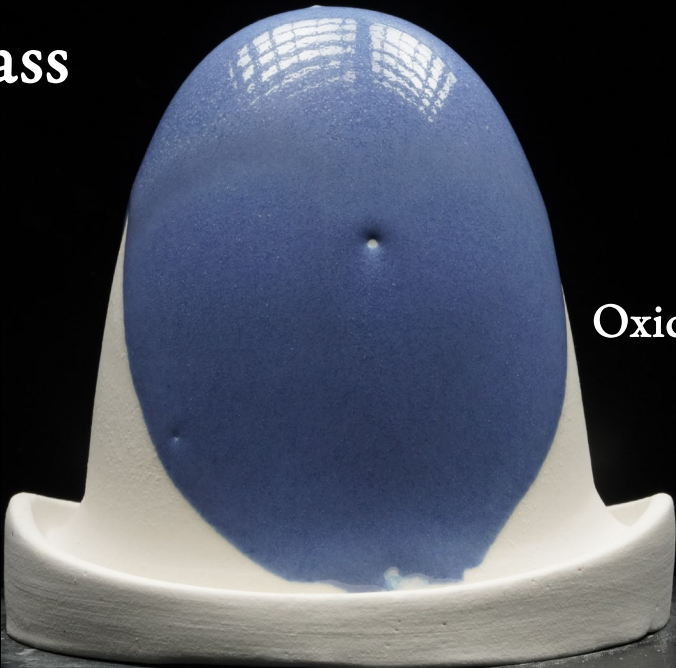
| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.28          |                          | Alkaline Earths<br>0.72 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.05                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.29 | Na <sub>2</sub> O<br>0.16      | K <sub>2</sub> O<br>0.04 | MgO<br>0.00             | CaO<br>0.34 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.29               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub><br>0.08 | ZnO<br>0.36             | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO<br>0.02 |



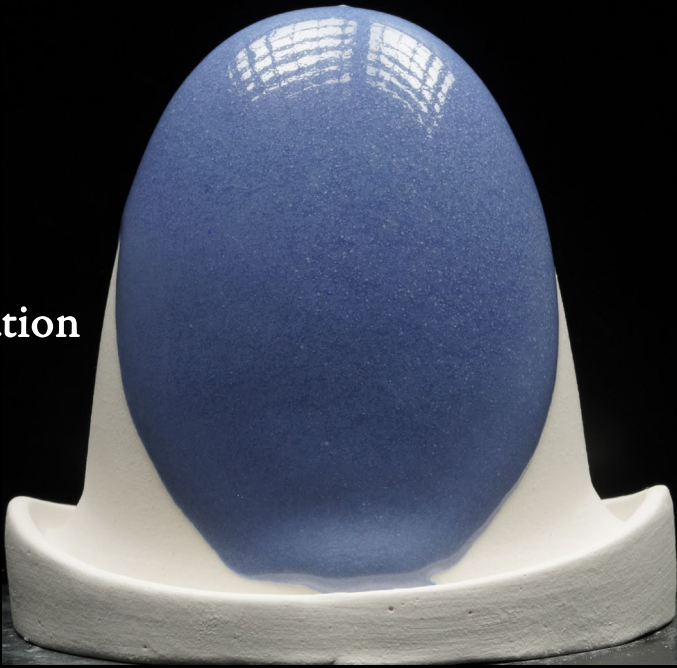


# Heart of Glass

|                   |       |
|-------------------|-------|
| Neph Sy           | 35.88 |
| Whiting           | 12.76 |
| Zinc Oxide        | 11.16 |
| EPK               | 8.05  |
| Flint             | 20.46 |
| Bentonite         | 1.78  |
| Cobalt Carbonate  | 0.90  |
| Ultrox (Zircopax) | 9.01  |
| Water             | 65    |



1-3 Second Dip



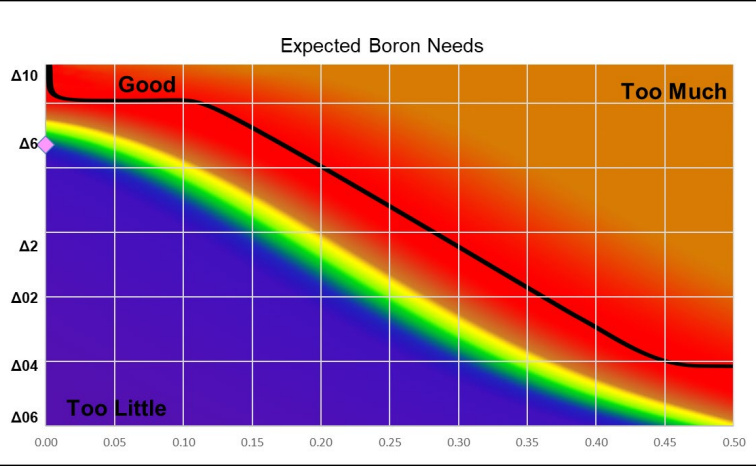
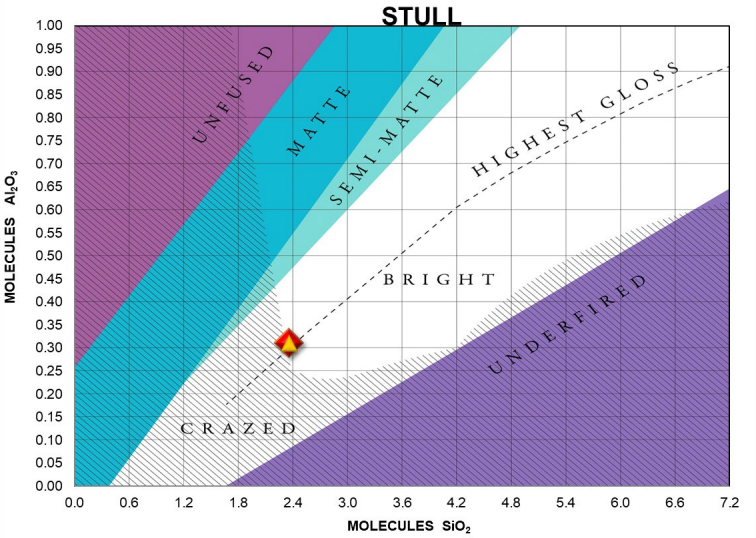
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.58 :1 |                                                      | Alkali Metals<br>0.22          |                          | Alkaline Earths<br>0.78 |             |
|-------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.36                                          | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.31 | Na <sub>2</sub> O<br>0.17      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.37 |
| B <sub>2</sub> O <sub>3</sub>                                     | Al <sub>2</sub> O <sub>3</sub><br>0.31               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                          | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.39             | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                    | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO<br>0.02 |

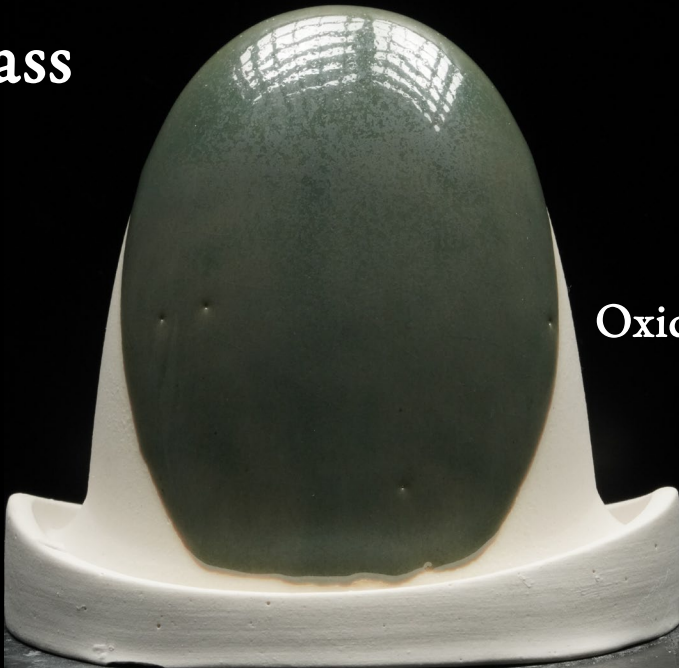


Ceramic  
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Workshop



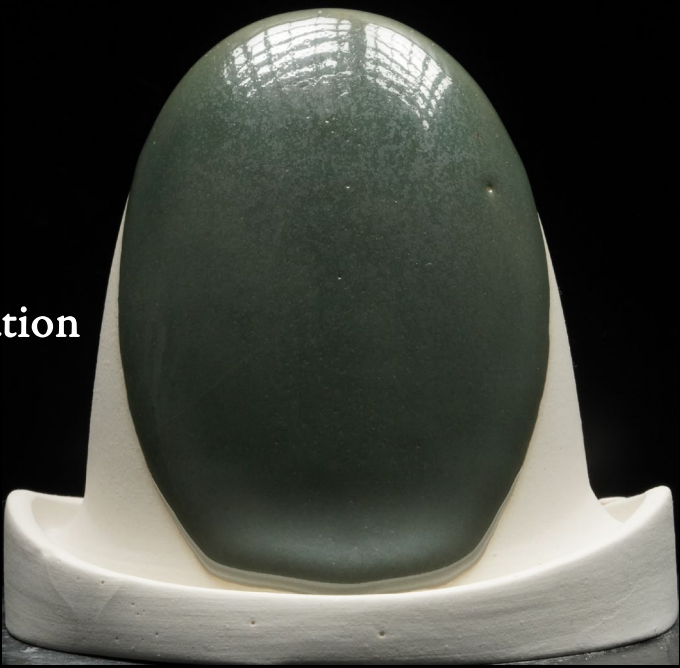
# Heart of Glass

|                  |       |
|------------------|-------|
| Neph Sy          | 38.29 |
| Whiting          | 13.62 |
| Zinc Oxide       | 11.91 |
| EPK              | 8.59  |
| Flint            | 21.84 |
| Bentonite        | 1.90  |
| Chrome Oxide     | 0.96  |
| Copper Carbonate | 2.88  |
| Water            | 60    |



Oxidation

1-3 Second Dip



2-3 Second Dips



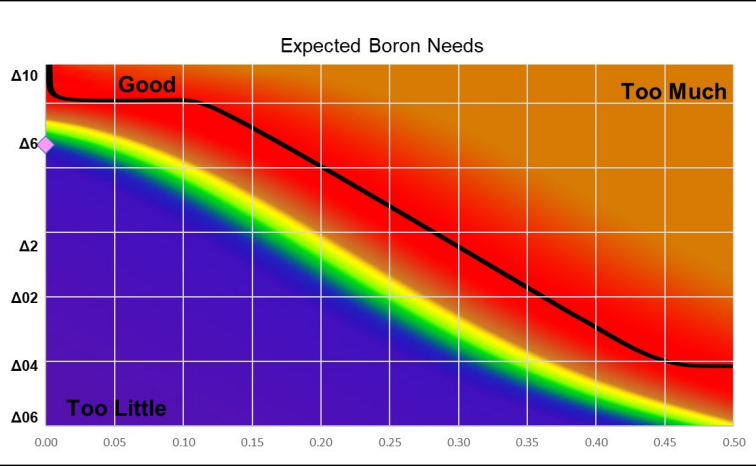
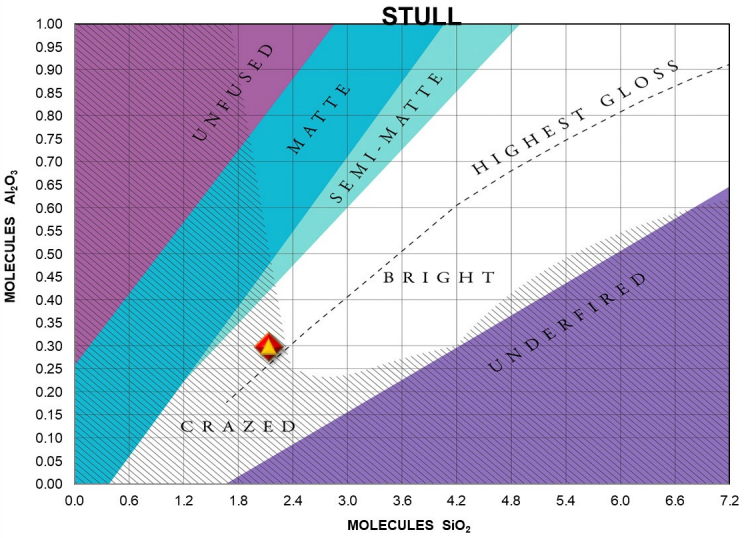
Reduction

1-3 Second Dip



2-3 Second Dips

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.27          |                          | Alkaline Earths<br>0.73 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.14                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.30 | Na <sub>2</sub> O<br>0.16      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.35 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.30               | Li <sub>2</sub> O              | CuO<br>0.06              | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.37             | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.02                             | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



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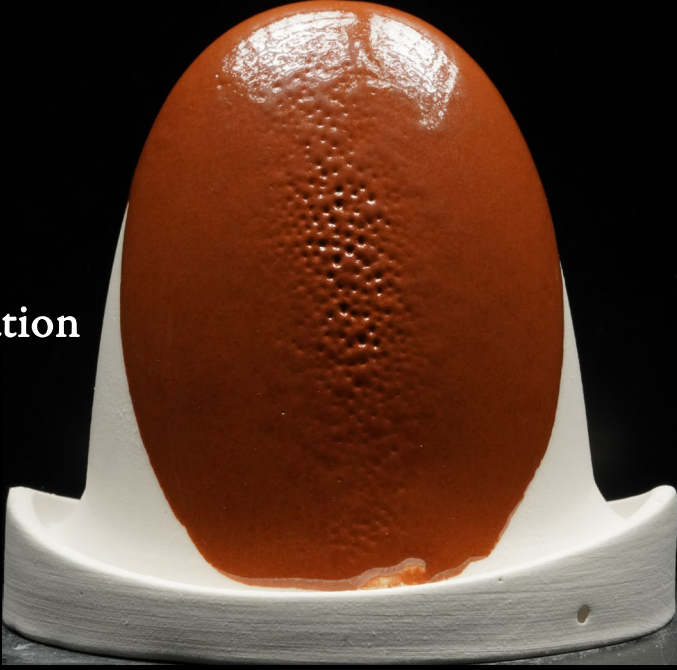


# Heart of Glass

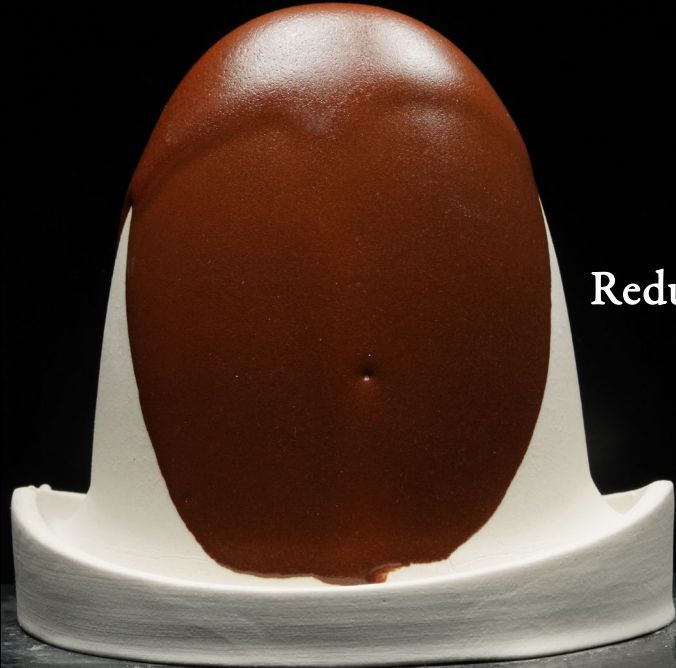
|                |       |
|----------------|-------|
| Neph Sy        | 37.22 |
| Whiting        | 13.23 |
| Zinc Oxide     | 11.58 |
| EPK            | 8.35  |
| Flint          | 21.22 |
| Bentonite      | 1.85  |
| Chrome Oxide   | 0.93  |
| Red Iron Oxide | 5.61  |
| Water          | 60    |



1-3 Second Dip



2-3 Second Dips

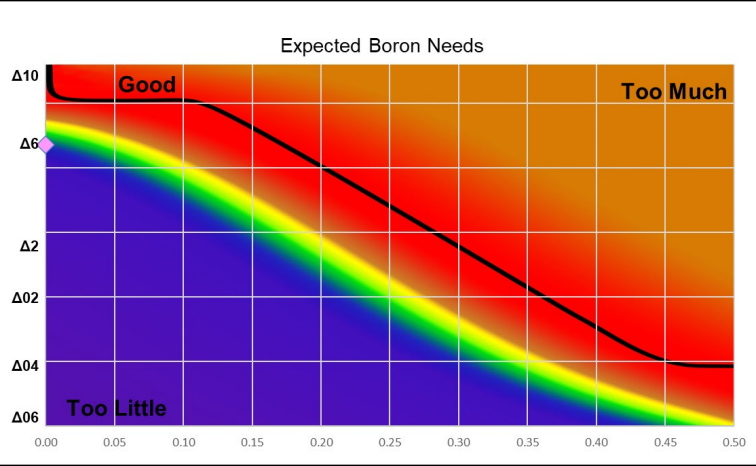
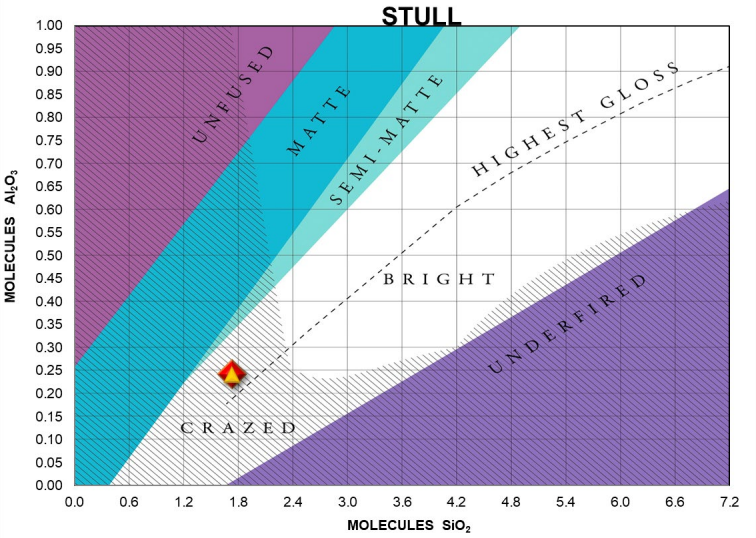


Reduction



Oxidation

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.73                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.24 | Na <sub>2</sub> O<br>0.13      | K <sub>2</sub> O<br>0.04 | MgO<br>0.00             | CaO<br>0.28 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.24               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.30             | FeO<br>0.24 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.01                             | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



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# Heart of Glass

|                   |       |
|-------------------|-------|
| Neph Sy           | 38.29 |
| Whiting           | 13.62 |
| Zinc Oxide        | 11.91 |
| EPK               | 8.59  |
| Flint             | 21.84 |
| Bentonite         | 1.90  |
| Chrome Oxide      | 0.96  |
| Manganese Dioxide | 2.88  |
| Water             | 60    |



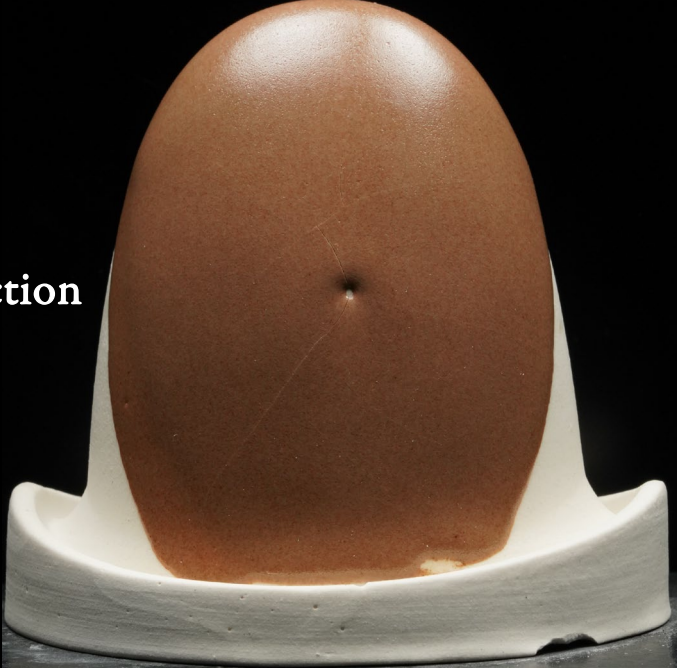
1-3 Second Dip



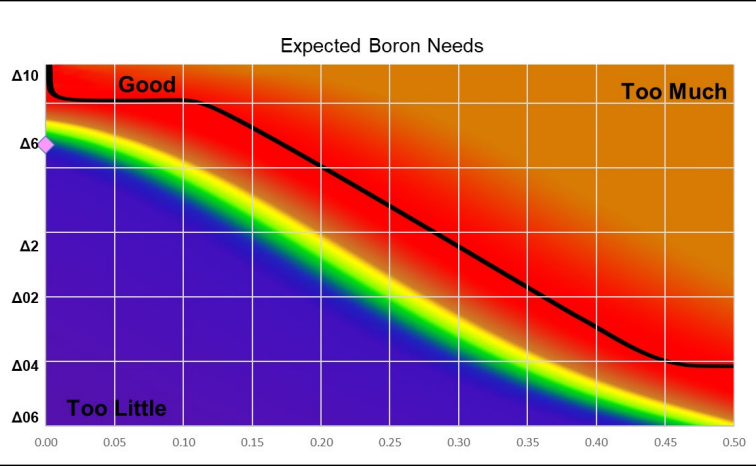
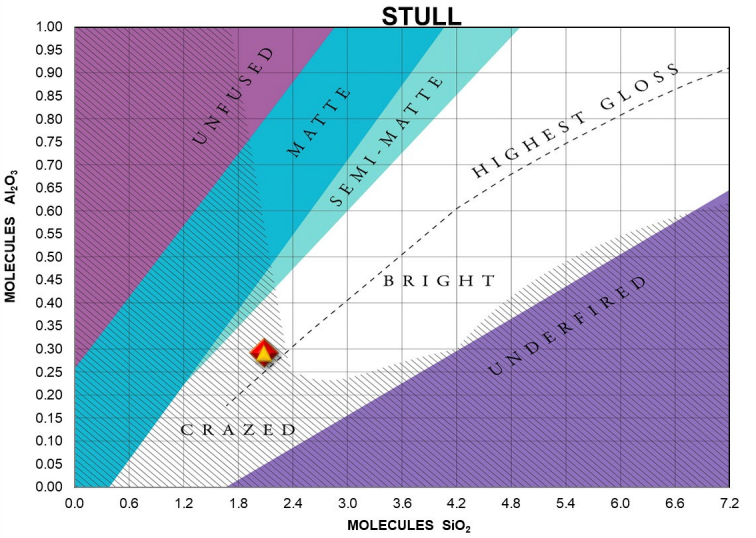
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 :1 |                                                      | Alkali Metals<br>0.20          |                          | Alkaline Earths<br>0.80  |             |
|-------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|--------------------------|-------------|
| SiO <sub>2</sub><br>2.09                                          | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.29 | Na <sub>2</sub> O<br>0.16      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00              | CaO<br>0.34 |
| B <sub>2</sub> O <sub>3</sub>                                     | Al <sub>2</sub> O <sub>3</sub><br>0.29               | Li <sub>2</sub> O              | CuO                      | SrO                      | BaO         |
| TiO <sub>2</sub><br>0.00                                          | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.36              | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.02                            | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub><br>0.08 | CoO         |

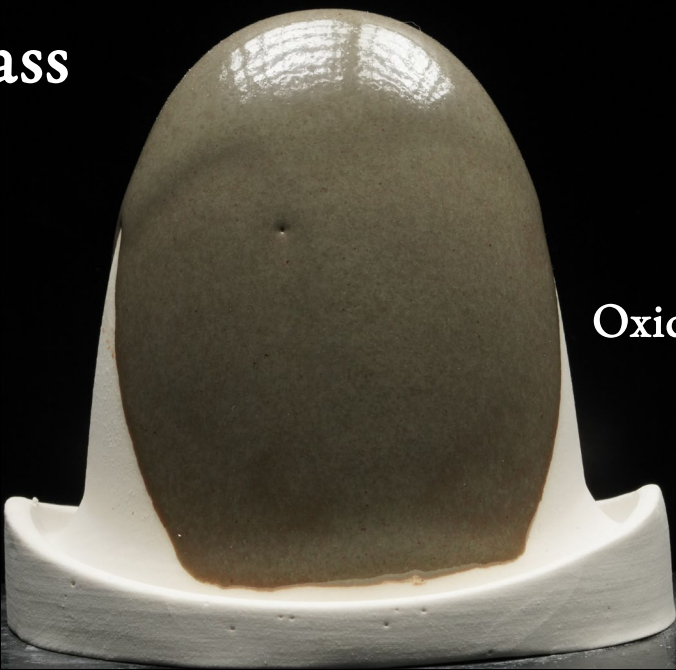


Ceramic  
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# Heart of Glass

|                     |       |
|---------------------|-------|
| Neph Sy             | 38.48 |
| Whiting             | 13.68 |
| Zinc Oxide          | 11.97 |
| EPK                 | 8.64  |
| Flint               | 21.94 |
| Bentonite           | 1.91  |
| Chrome Oxide        | 0.97  |
| Nickel Carb (Green) | 2.42  |
| Water               | 60    |



Oxidation

1-3 Second Dip

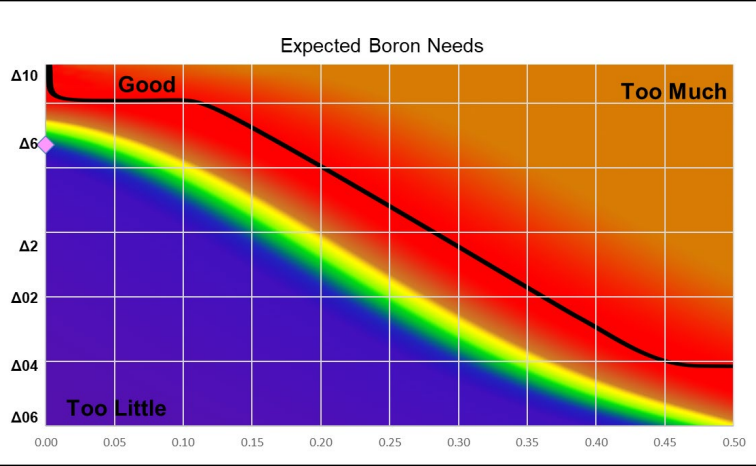
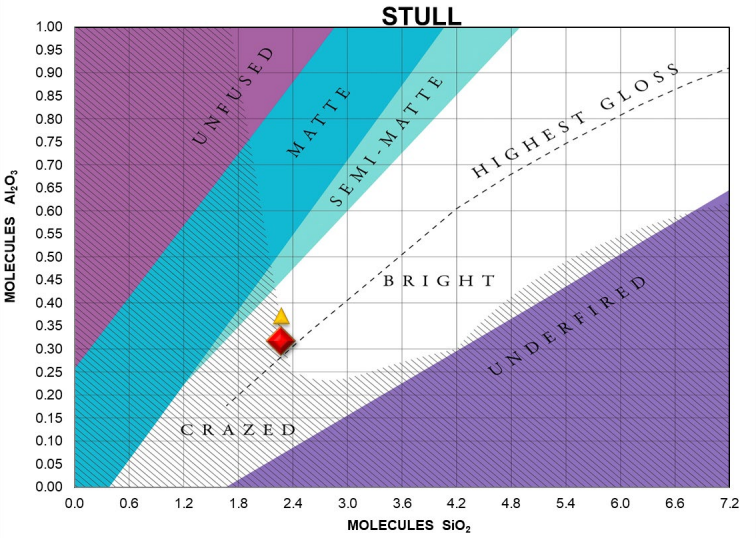


2-3 Second Dips



Reduction

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>6.09 : 1 |                                                      | Alkali Metals<br>0.22          |                          | Alkaline Earths<br>0.78 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.27                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.37 | Na <sub>2</sub> O<br>0.17      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.37 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.32               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO<br>0.05                                          | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.39             | FeO<br>0.01 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.02                             | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |

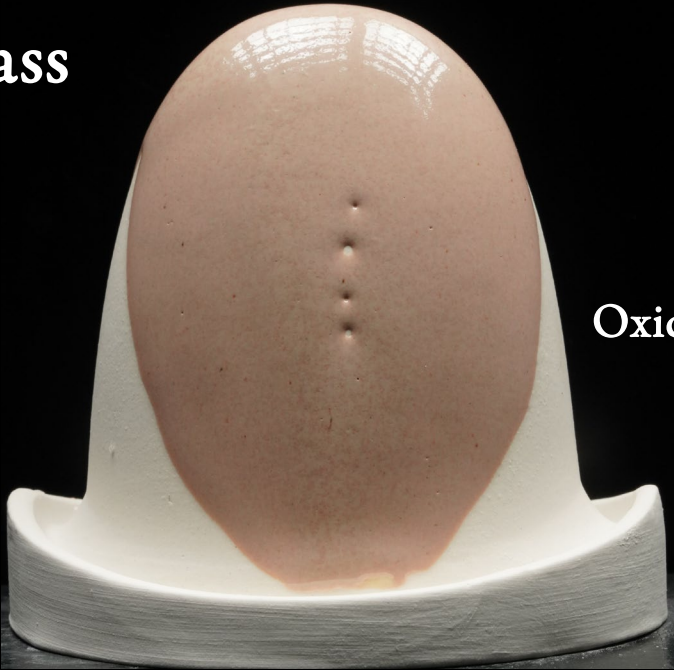


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# Heart of Glass

|                  |       |
|------------------|-------|
| Neph Sy          | 37.22 |
| Whiting          | 13.23 |
| Zinc Oxide       | 11.58 |
| EPK              | 8.35  |
| Flint            | 21.22 |
| Bentonite        | 1.85  |
| Chrome Oxide     | 0.93  |
| Titanium Dioxide | 5.61  |
| Water            | 60    |



1-3 Second Dip



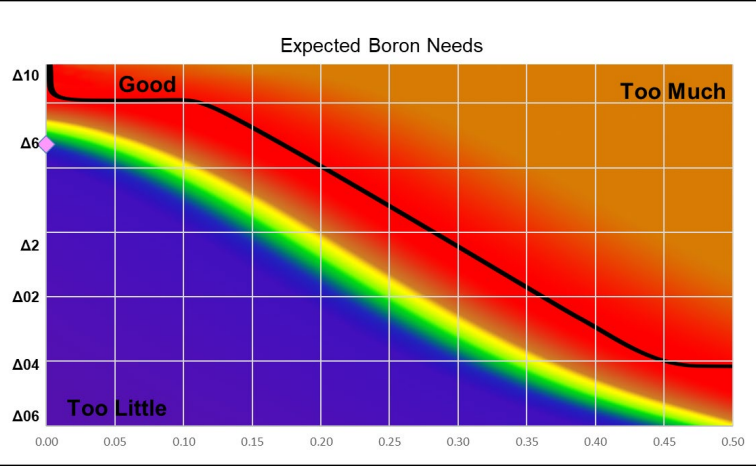
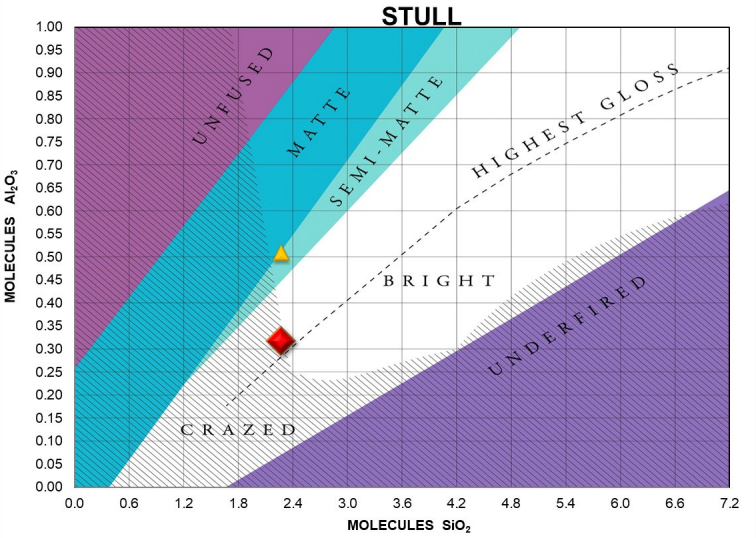
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>4.45 : 1 |                                                      | Alkali Metals<br>0.22          |                          | Alkaline Earths<br>0.78 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.27                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.51 | Na <sub>2</sub> O<br>0.17      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.37 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.32               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.19                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.39             | FeO<br>0.01 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.02                             | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |

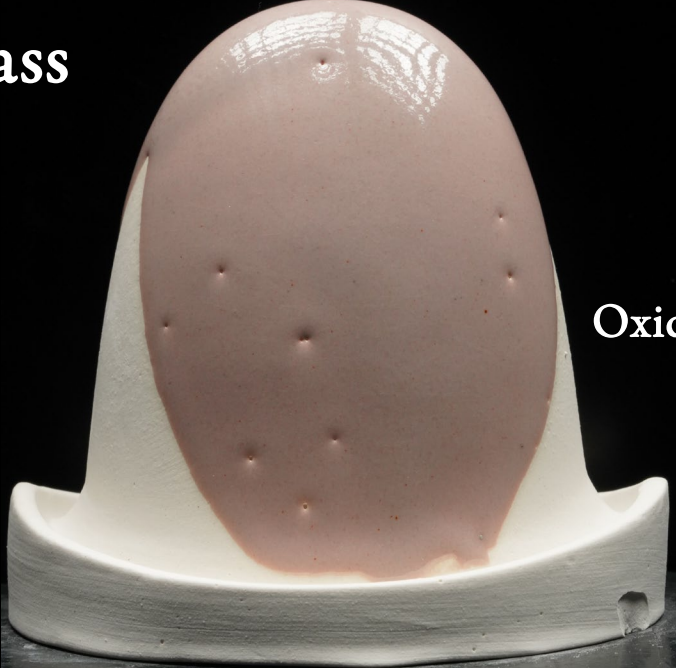


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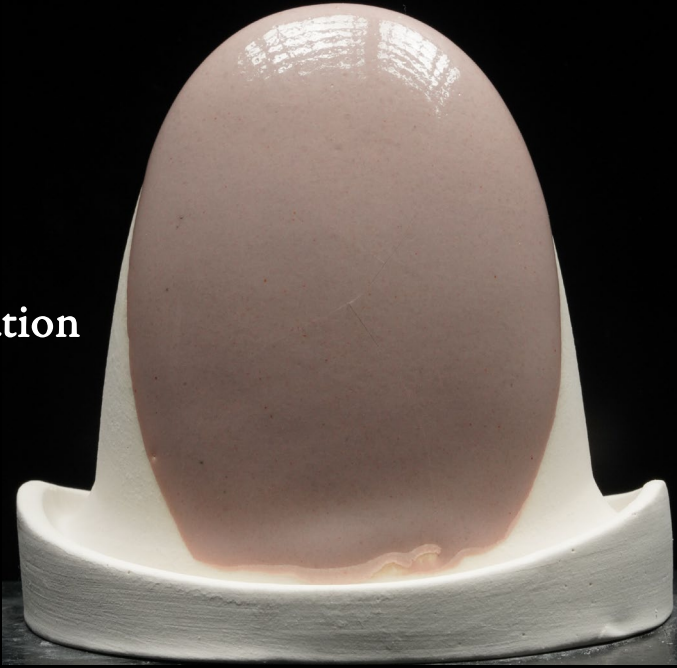


# Heart of Glass

|              |       |
|--------------|-------|
| Neph Sy      | 37.57 |
| Whiting      | 13.36 |
| Zinc Oxide   | 11.69 |
| EPK          | 8.43  |
| Flint        | 21.42 |
| Bentonite    | 1.87  |
| Chrome Oxide | 0.94  |
| Tin Oxide    | 4.72  |
| Water        | 60    |



1-3 Second Dip



2-3 Second Dips

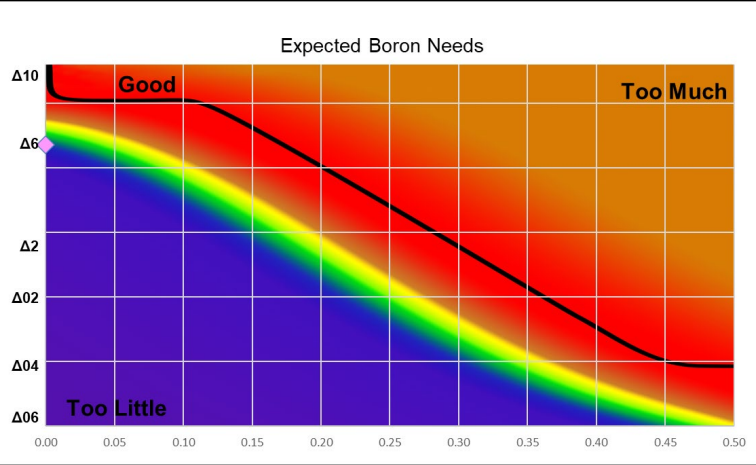
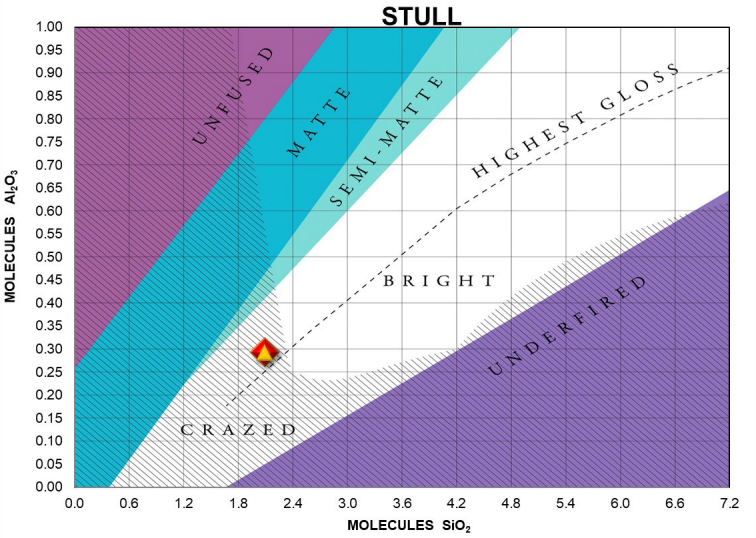


Reduction



Oxidation

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.28          |                          | Alkaline Earths<br>0.72 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.09                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.29 | Na <sub>2</sub> O<br>0.16      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.34 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.29               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub><br>0.08 | ZnO<br>0.36             | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.02                             | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |

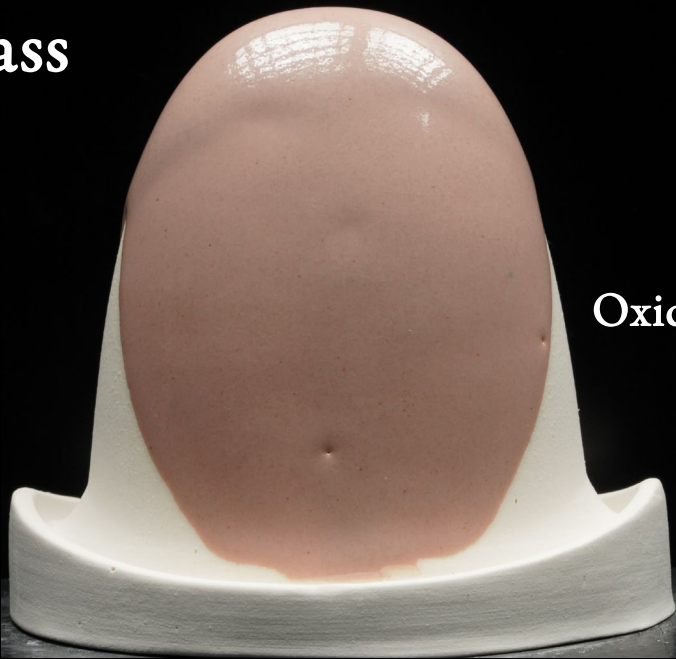


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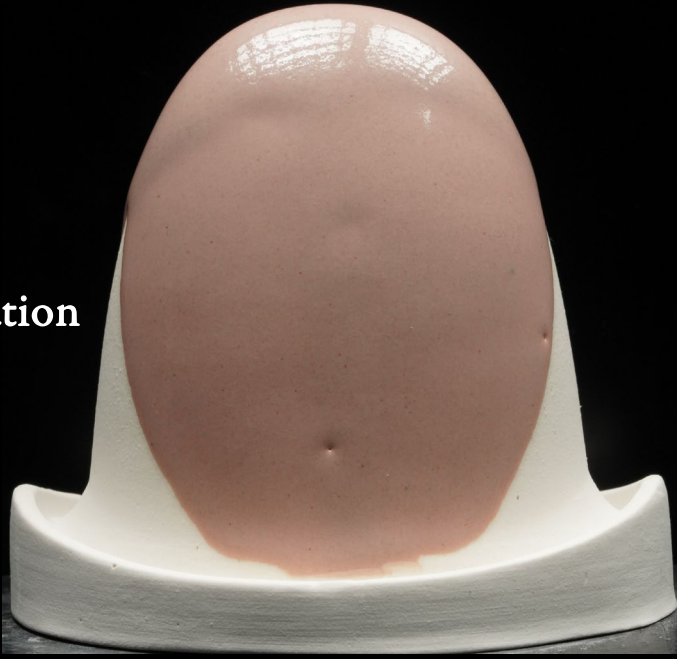


# Heart of Glass

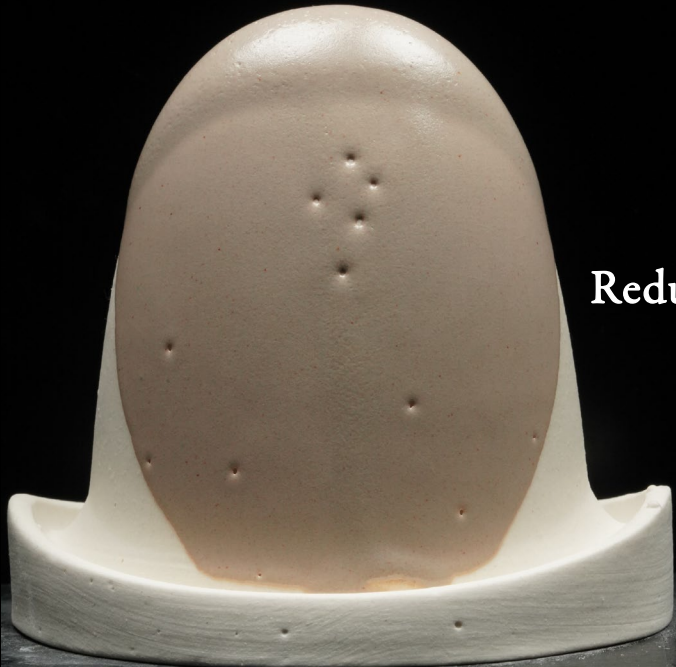
|                   |       |
|-------------------|-------|
| Neph Sy           | 35.88 |
| Whiting           | 12.76 |
| Zinc Oxide        | 11.16 |
| EPK               | 8.05  |
| Flint             | 20.46 |
| Bentonite         | 1.78  |
| Chrome Oxide      | 0.90  |
| Ultrox (Zircopax) | 9.01  |
| Water             | 60    |



Oxidation



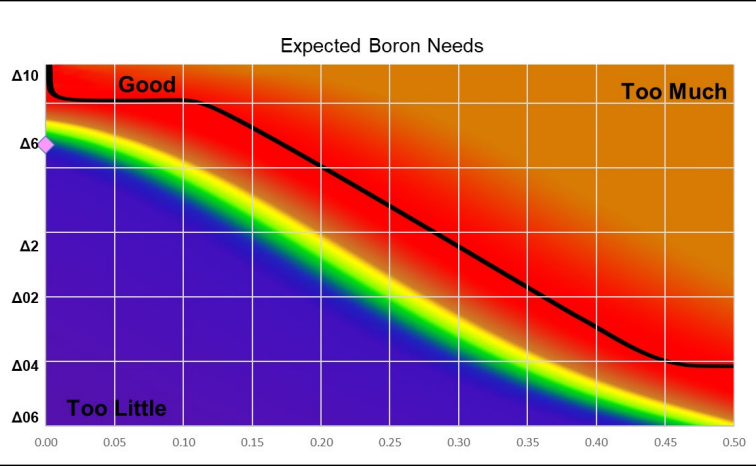
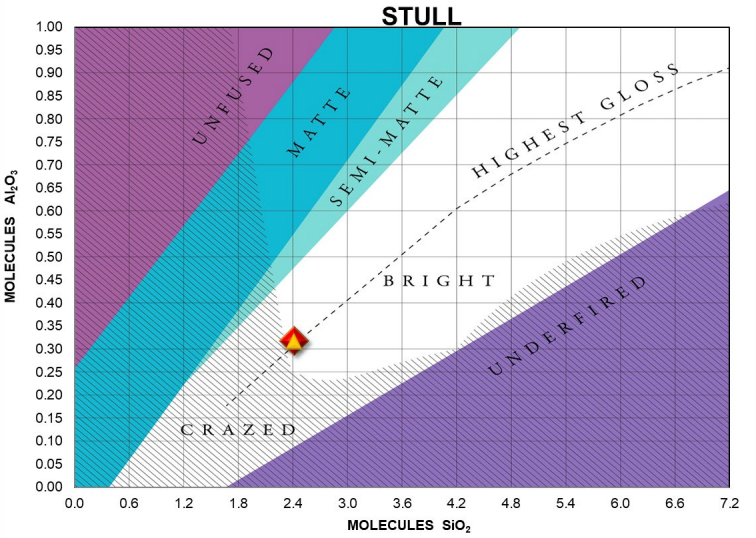
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.58 : 1 |                                                      | Alkali Metals<br>0.22          |                          | Alkaline Earths<br>0.78 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.41                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.32 | Na <sub>2</sub> O<br>0.17      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.37 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.32               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.39             | FeO<br>0.01 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.02                             | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |

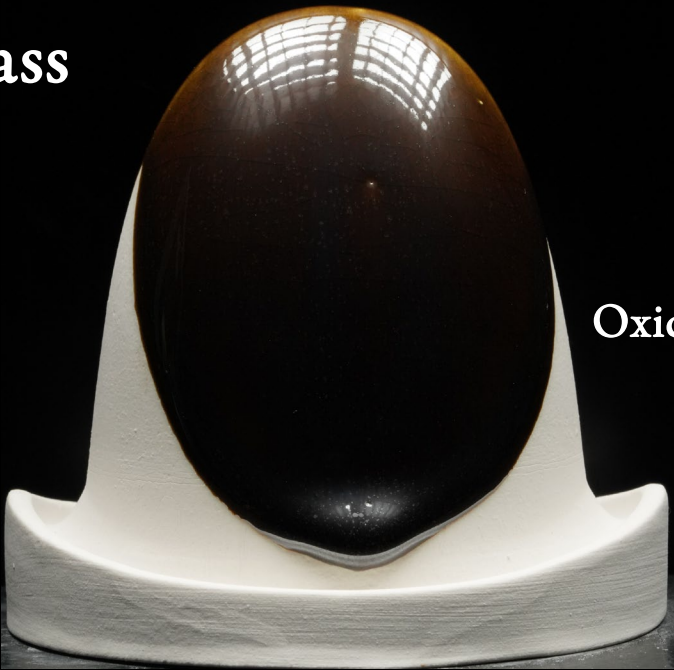


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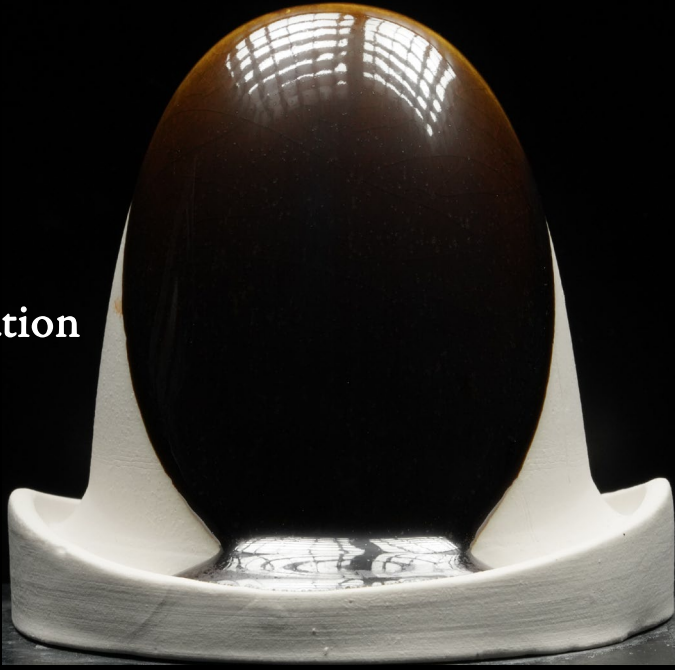
# Heart of Glass

|                  |       |
|------------------|-------|
| Neph Sy          | 36.54 |
| Whiting          | 12.99 |
| Zinc Oxide       | 11.37 |
| EPK              | 8.20  |
| Flint            | 20.83 |
| Bentonite        | 1.82  |
| Copper Carbonate | 2.75  |
| Red Iron Oxide   | 5.50  |
| Water            | 60    |



Oxidation

1-3 Second Dip



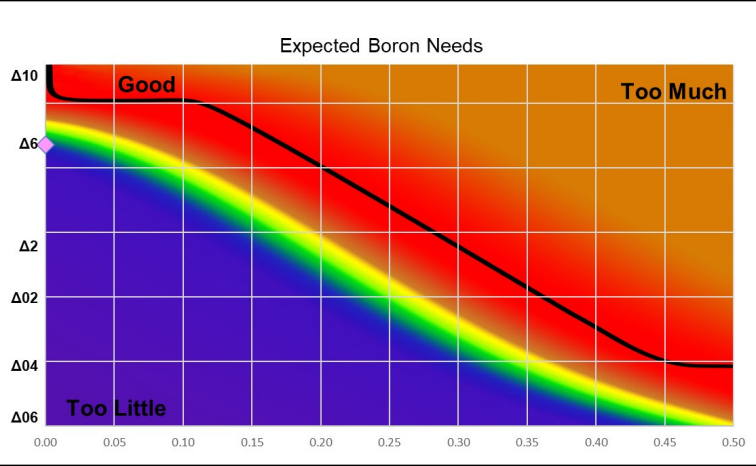
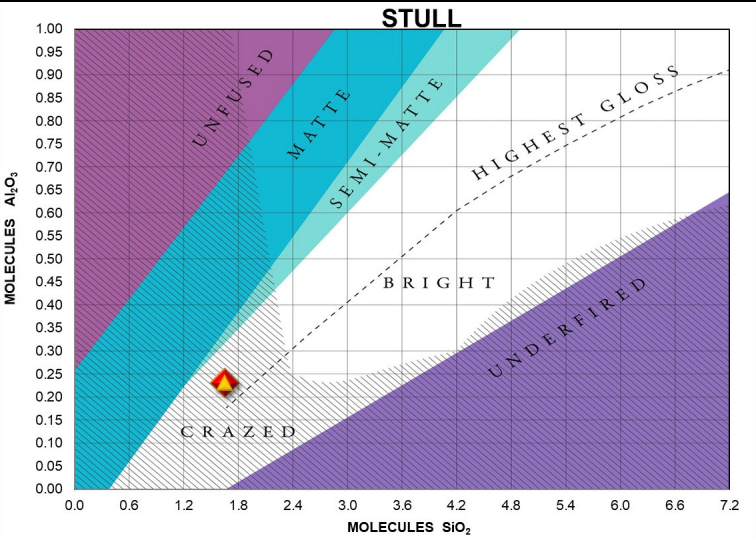
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.21          |                          | Alkaline Earths<br>0.79 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.65                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.23 | Na <sub>2</sub> O<br>0.13      | K <sub>2</sub> O<br>0.04 | MgO<br>0.00             | CaO<br>0.27 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.23               | Li <sub>2</sub> O              | CuO<br>0.05              | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.29             | FeO<br>0.23 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |

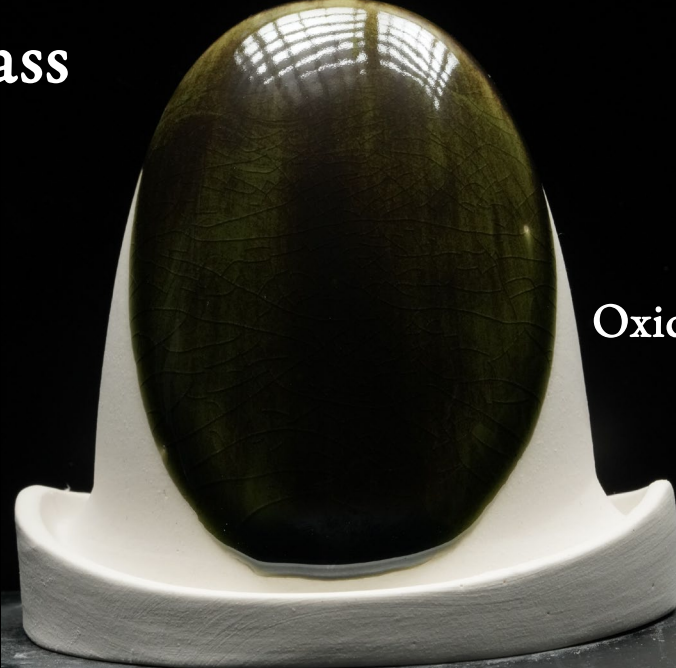


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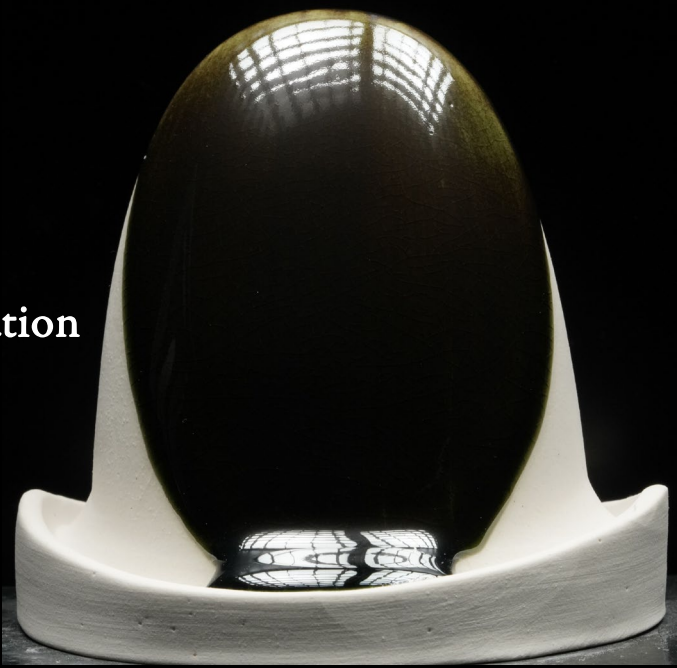


# Heart of Glass

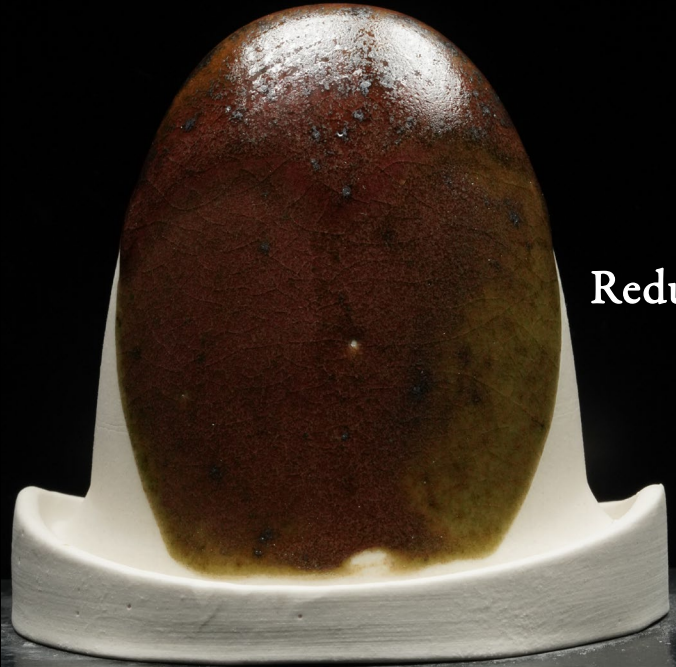
|                   |       |
|-------------------|-------|
| Neph Sy           | 37.57 |
| Whiting           | 13.36 |
| Zinc Oxide        | 11.69 |
| EPK               | 8.43  |
| Flint             | 21.42 |
| Bentonite         | 1.87  |
| Copper Carbonate  | 2.83  |
| Manganese Dioxide | 2.83  |
| Water             | 60    |



1-3 Second Dip



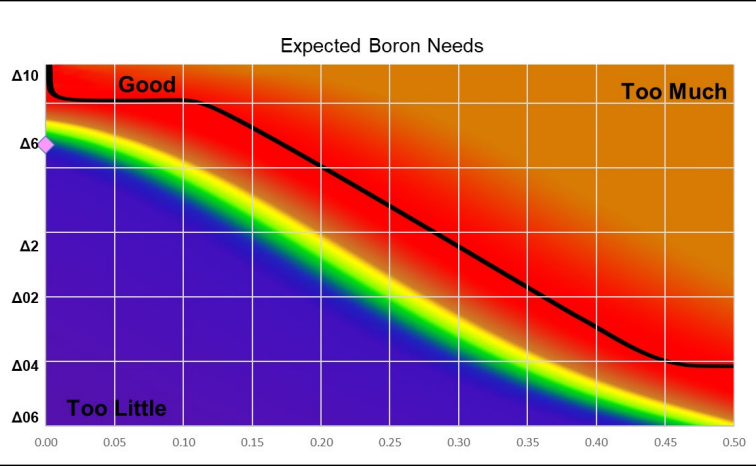
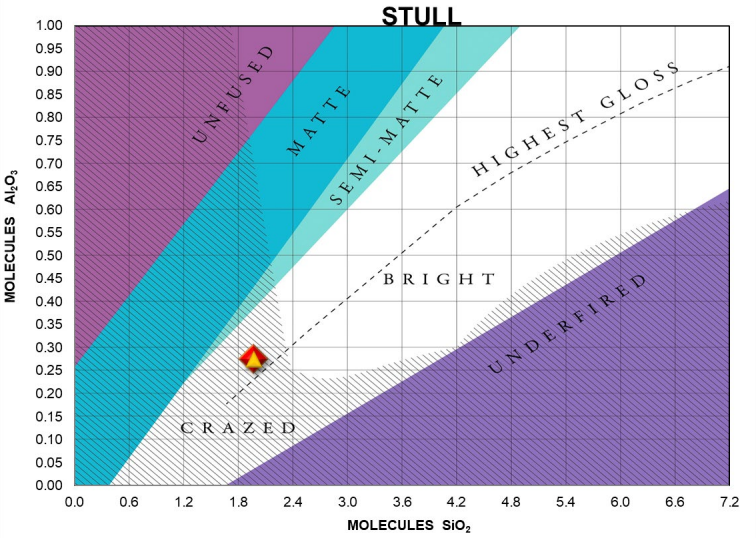
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.25          |                          | Alkaline Earths<br>0.75  |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|--------------------------|-------------|
| SiO <sub>2</sub><br>1.97                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.28 | Na <sub>2</sub> O<br>0.15      | K <sub>2</sub> O<br>0.04 | MgO<br>0.00              | CaO<br>0.32 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.27               | Li <sub>2</sub> O              | CuO<br>0.05              | SrO                      | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.34              | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub><br>0.08 | CoO         |

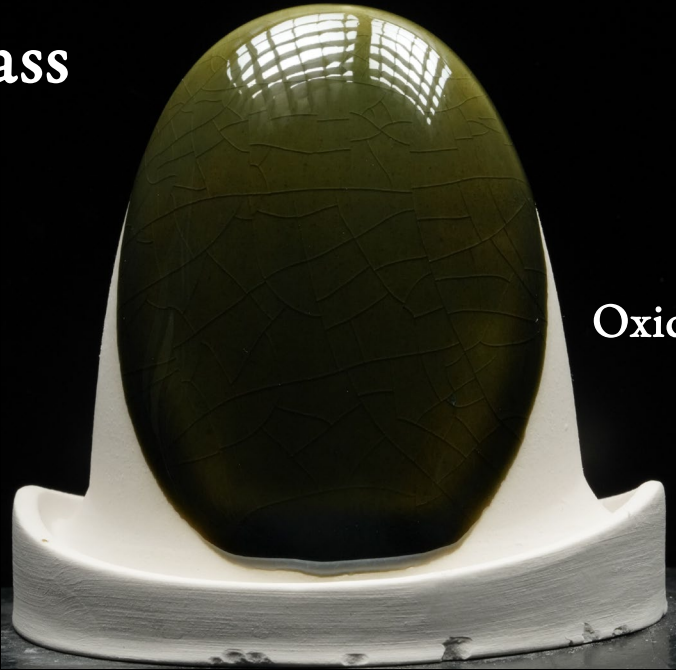


Ceramic  
Materials  
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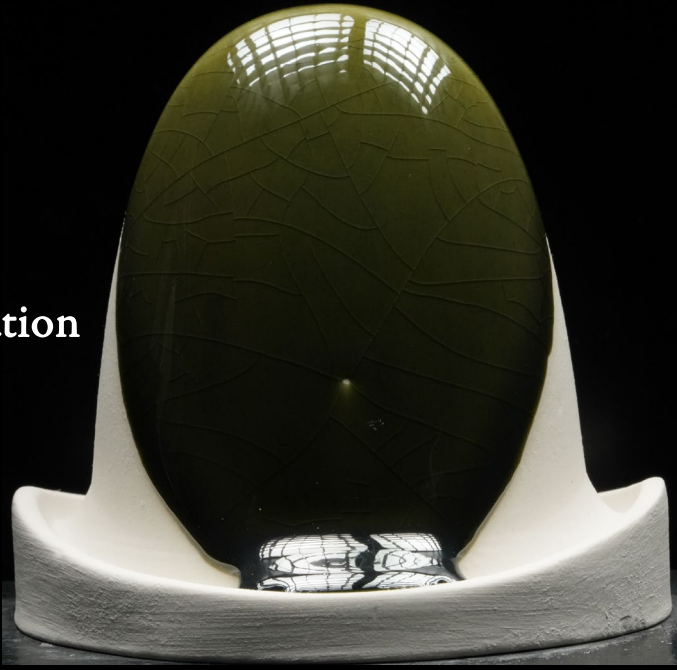
# Heart of Glass

|                     |       |
|---------------------|-------|
| Neph Sy             | 37.75 |
| Whiting             | 13.42 |
| Zinc Oxide          | 11.74 |
| EPK                 | 8.47  |
| Flint               | 21.53 |
| Bentonite           | 1.88  |
| Copper Carbonate    | 2.84  |
| Nickel Carb (Green) | 2.37  |
| Water               | 60    |



Oxidation

1-3 Second Dip

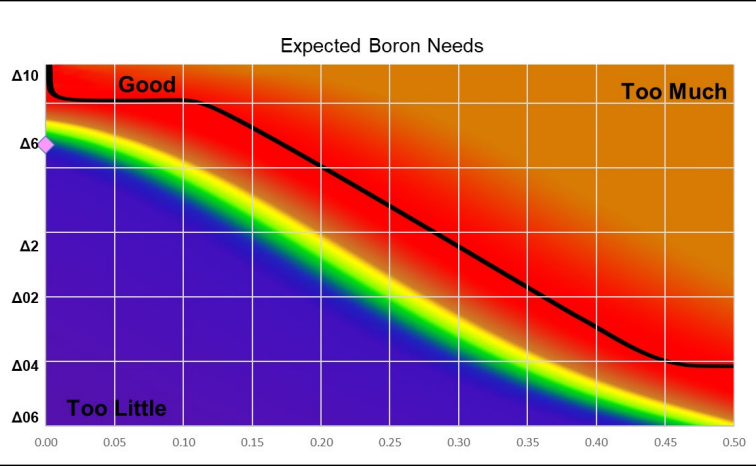
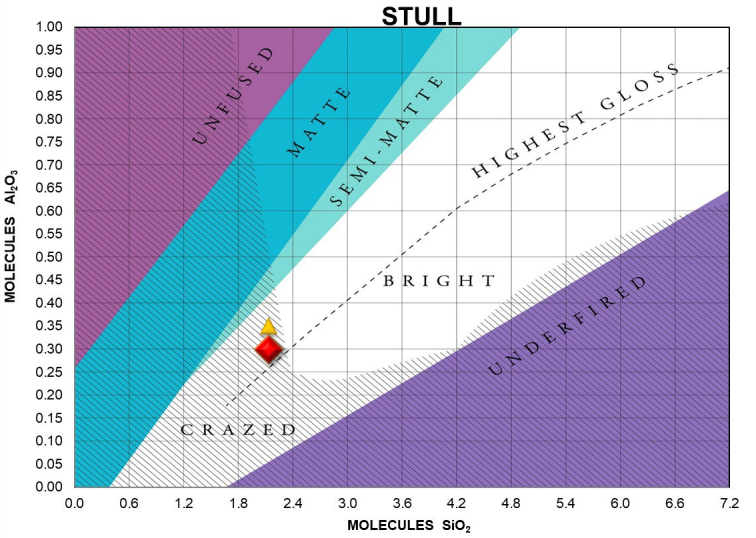


2-3 Second Dips



Reduction

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>6.09 : 1 |                                                      | Alkali Metals<br>0.27          |                          | Alkaline Earths<br>0.73 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.14                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.35 | Na <sub>2</sub> O<br>0.16      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.35 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.30               | Li <sub>2</sub> O              | CuO<br>0.06              | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO<br>0.05                                          | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.37             | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |

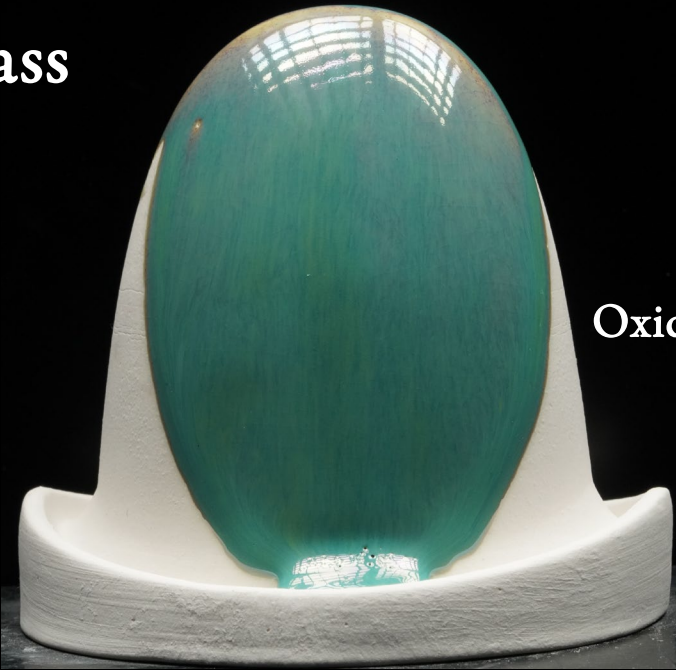


Ceramic  
Materials  
Workshop

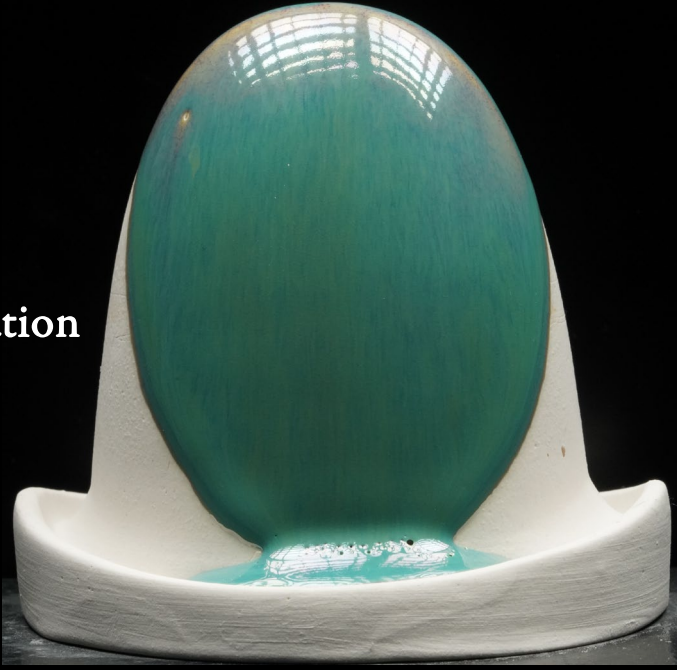


# Heart of Glass

|                  |       |
|------------------|-------|
| Neph Sy          | 36.54 |
| Whiting          | 12.99 |
| Zinc Oxide       | 11.37 |
| EPK              | 8.20  |
| Flint            | 20.83 |
| Bentonite        | 1.82  |
| Copper Carbonate | 2.75  |
| Titanium Dioxide | 5.50  |
| Water            | 60    |



Oxidation



1-3 Second Dip

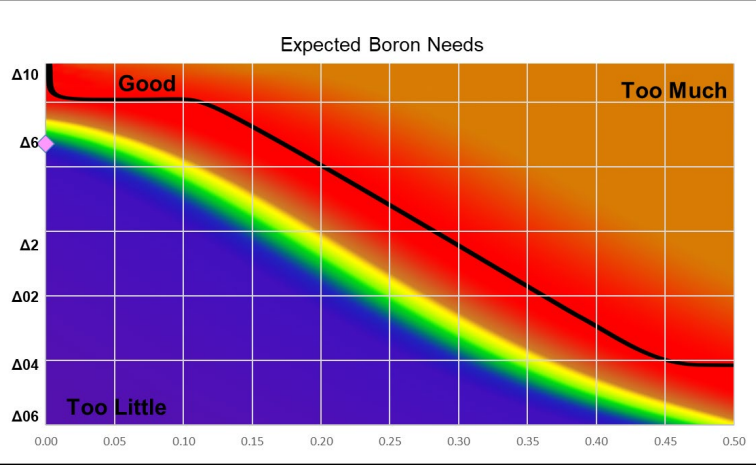
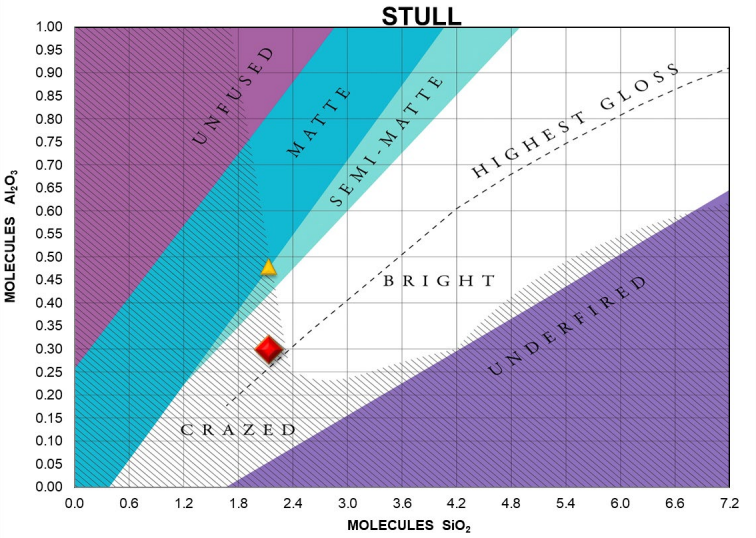
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>4.45 : 1 |                                                      | Alkali Metals<br>0.27          |                          | Alkaline Earths<br>0.73 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.14                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.48 | Na <sub>2</sub> O<br>0.16      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.35 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.30               | Li <sub>2</sub> O              | CuO<br>0.06              | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.18                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.37             | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |

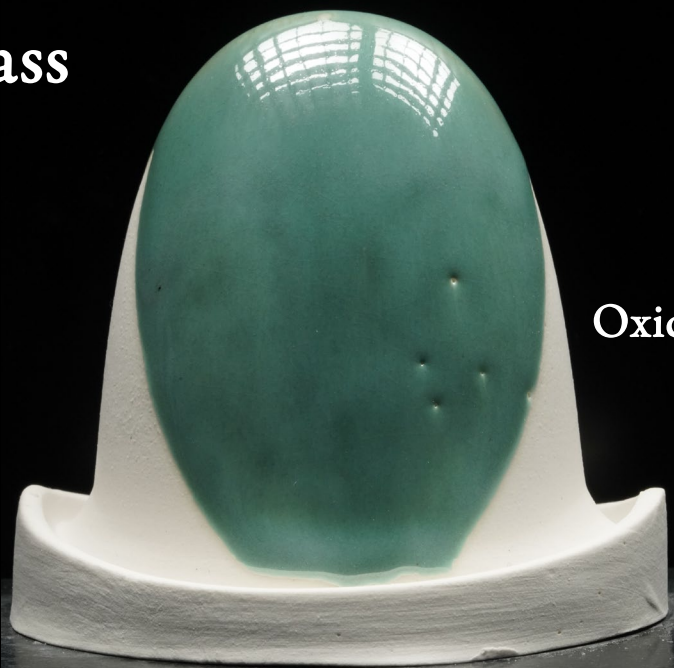


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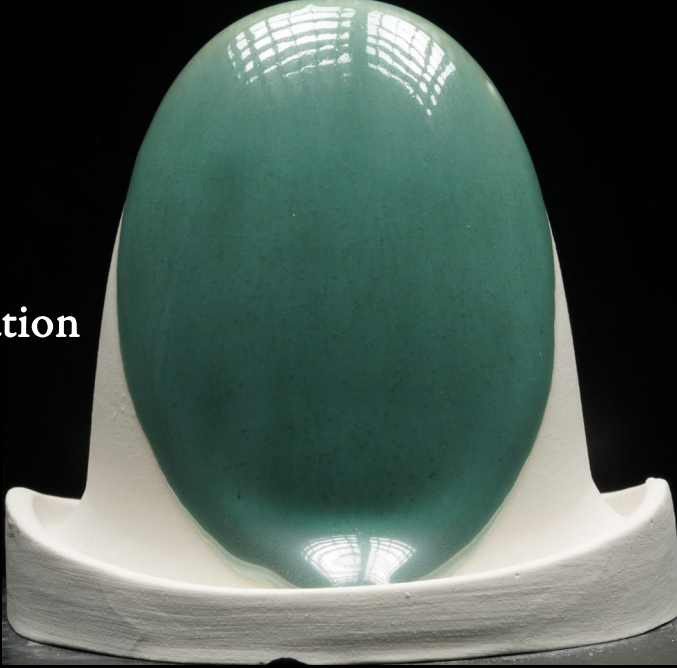


# Heart of Glass

|                  |       |
|------------------|-------|
| Neph Sy          | 36.87 |
| Whiting          | 13.11 |
| Zinc Oxide       | 11.47 |
| EPK              | 8.28  |
| Flint            | 21.03 |
| Bentonite        | 1.83  |
| Copper Carbonate | 2.78  |
| Tin Oxide        | 4.63  |
| Water            | 60    |



1-3 Second Dip



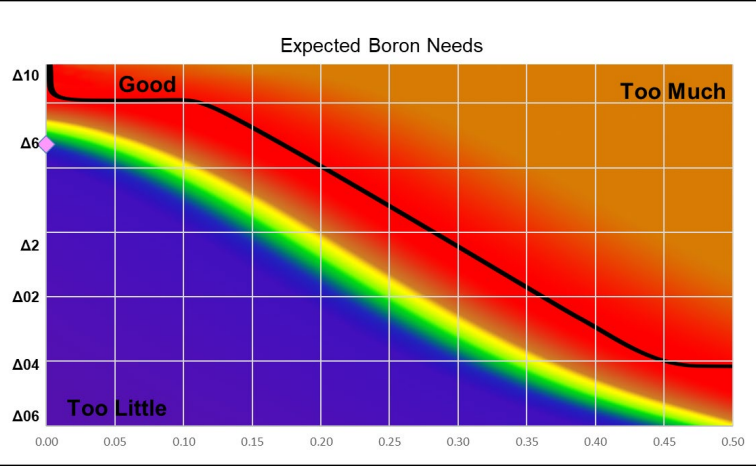
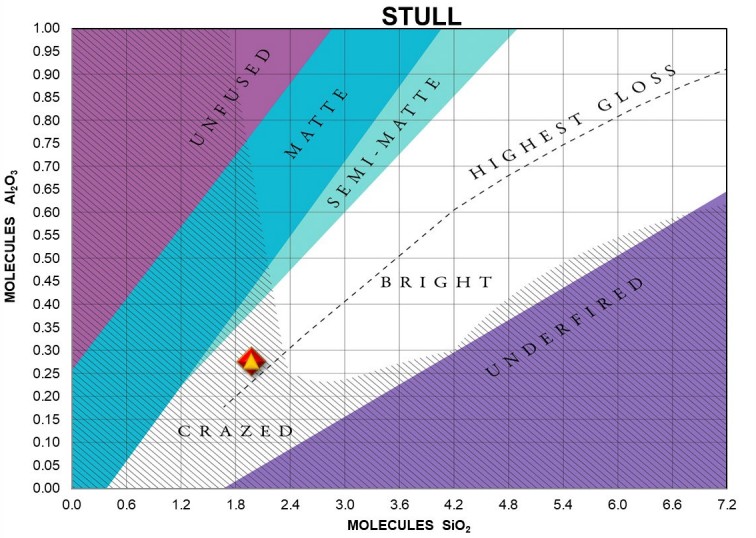
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.32          |                          | Alkaline Earths<br>0.68 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.98                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.28 | Na <sub>2</sub> O<br>0.15      | K <sub>2</sub> O<br>0.04 | MgO<br>0.00             | CaO<br>0.33 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.28               | Li <sub>2</sub> O              | CuO<br>0.05              | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub><br>0.07 | ZnO<br>0.34             | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |

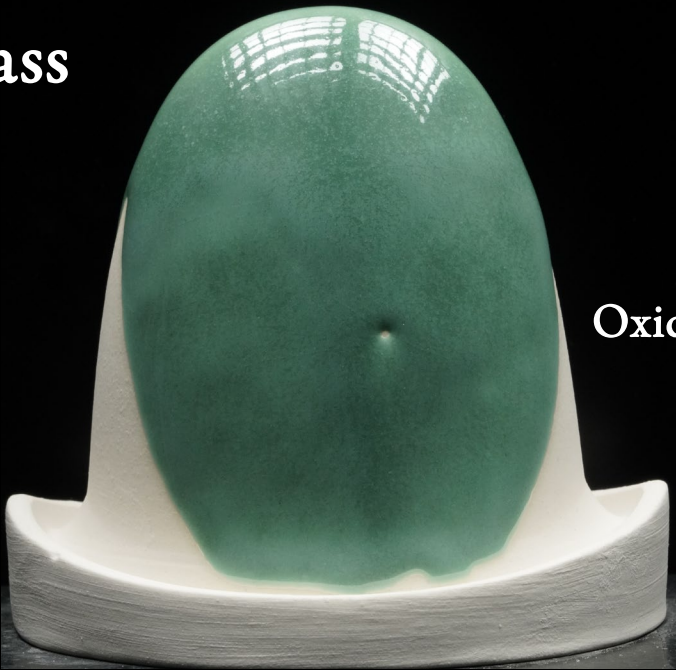


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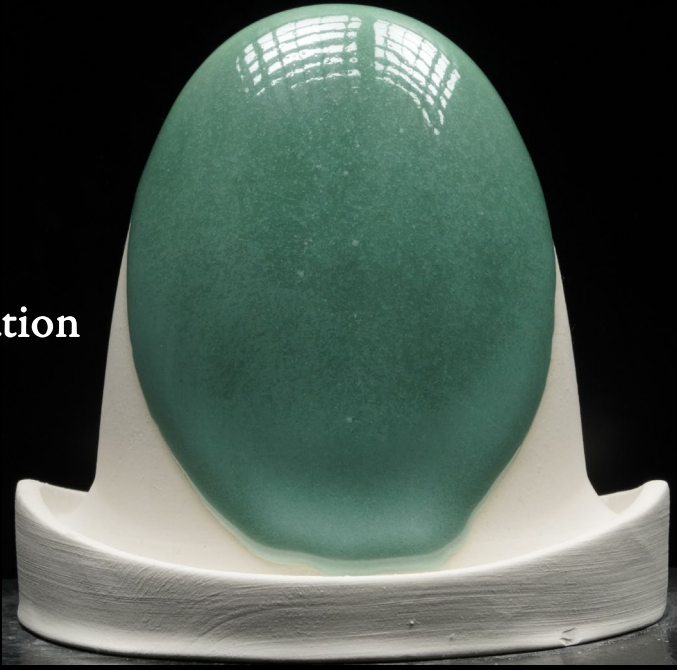


# Heart of Glass

|                   |       |
|-------------------|-------|
| Neph Sy           | 35.24 |
| Whiting           | 12.53 |
| Zinc Oxide        | 10.96 |
| EPK               | 7.91  |
| Flint             | 20.10 |
| Bentonite         | 1.75  |
| Copper Carbonate  | 2.65  |
| Ultrox (Zircopax) | 8.85  |
| Water             | 60    |



1-3 Second Dip



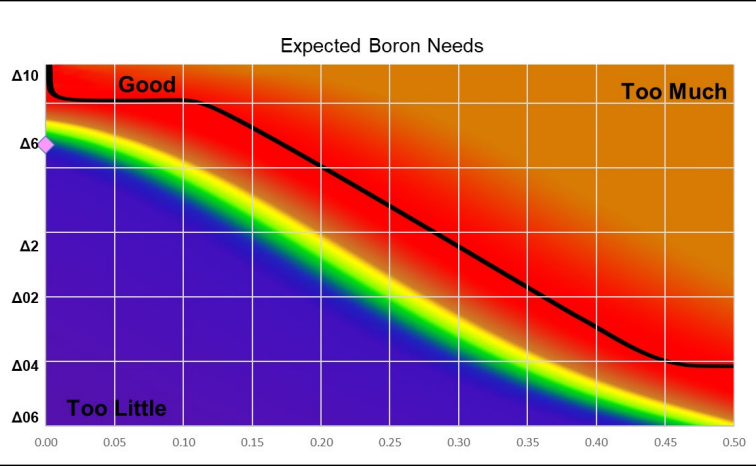
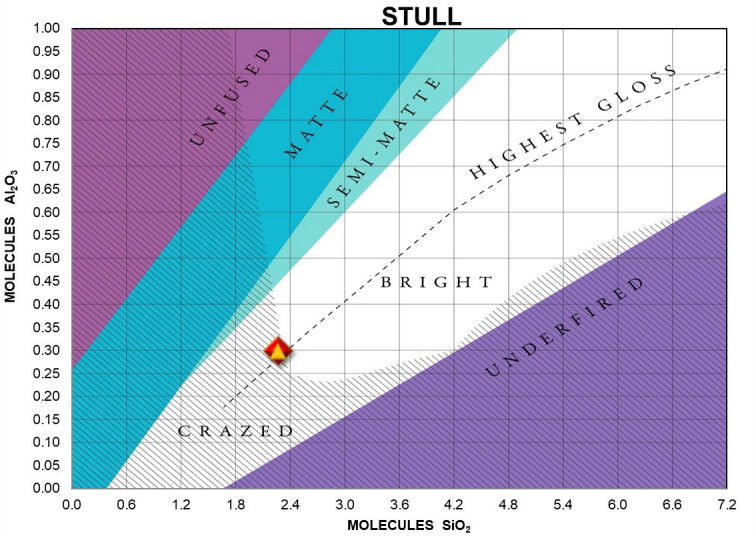
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.58 :1 |                                                      | Alkali Metals<br>0.27          |                          | Alkaline Earths<br>0.73 |             |
|-------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.27                                          | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.30 | Na <sub>2</sub> O<br>0.16      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.35 |
| B <sub>2</sub> O <sub>3</sub>                                     | Al <sub>2</sub> O <sub>3</sub><br>0.30               | Li <sub>2</sub> O              | CuO<br>0.06              | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                          | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.37             | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                    | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



Ceramic  
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# Heart of Glass

|                   |       |
|-------------------|-------|
| Neph Sy           | 36.54 |
| Whiting           | 12.99 |
| Zinc Oxide        | 11.37 |
| EPK               | 8.20  |
| Flint             | 20.83 |
| Bentonite         | 1.82  |
| Red Iron Oxide    | 5.50  |
| Manganese Dioxide | 2.75  |
| Water             | 60    |



1-3 Second Dip



2-3 Second Dips



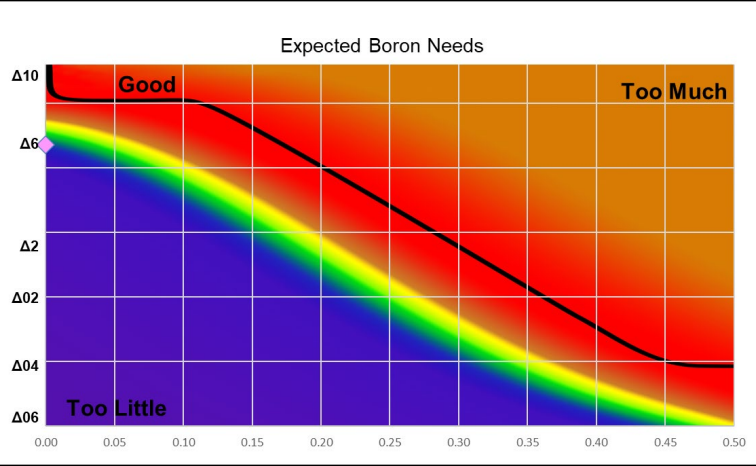
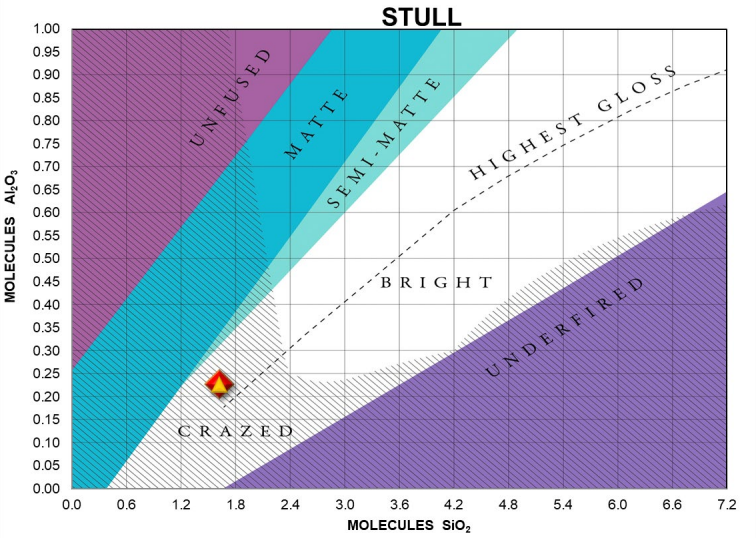
Reduction



Reduction

Oxidation

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.16          |                          | Alkaline Earths<br>0.84  |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|--------------------------|-------------|
| SiO <sub>2</sub><br>1.62                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.23 | Na <sub>2</sub> O<br>0.12      | K <sub>2</sub> O<br>0.04 | MgO<br>0.00              | CaO<br>0.27 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.23               | Li <sub>2</sub> O              | CuO                      | SrO                      | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.28              | FeO<br>0.23 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub><br>0.06 | CoO         |



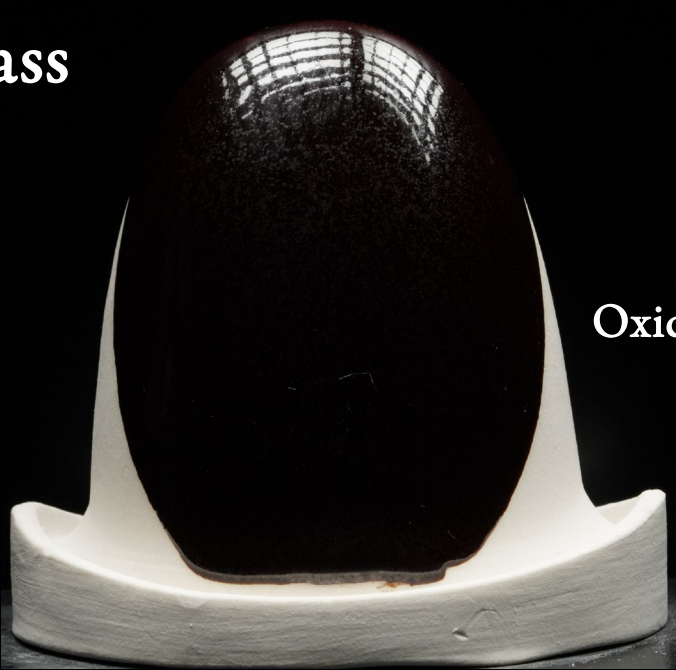
Ceramic  
Materials  
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# Heart of Glass

|                     |       |
|---------------------|-------|
| Neph Sy             | 36.70 |
| Whiting             | 13.05 |
| Zinc Oxide          | 11.42 |
| EPK                 | 8.24  |
| Flint               | 20.93 |
| Bentonite           | 1.82  |
| Red Iron Oxide      | 5.53  |
| Nickel Carb (Green) | 2.30  |
| Water               | 60    |

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>6.09 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.73                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.28 | Na <sub>2</sub> O<br>0.13      | K <sub>2</sub> O<br>0.04 | MgO<br>0.00             | CaO<br>0.28 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.24               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO<br>0.04                                          | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.30             | FeO<br>0.24 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



Oxidation

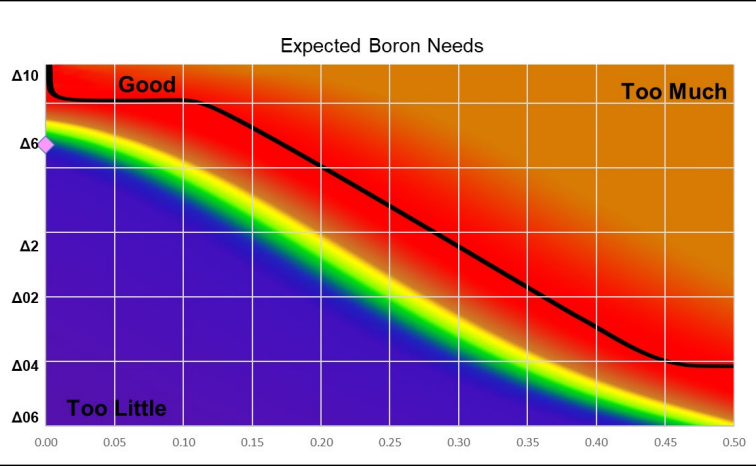
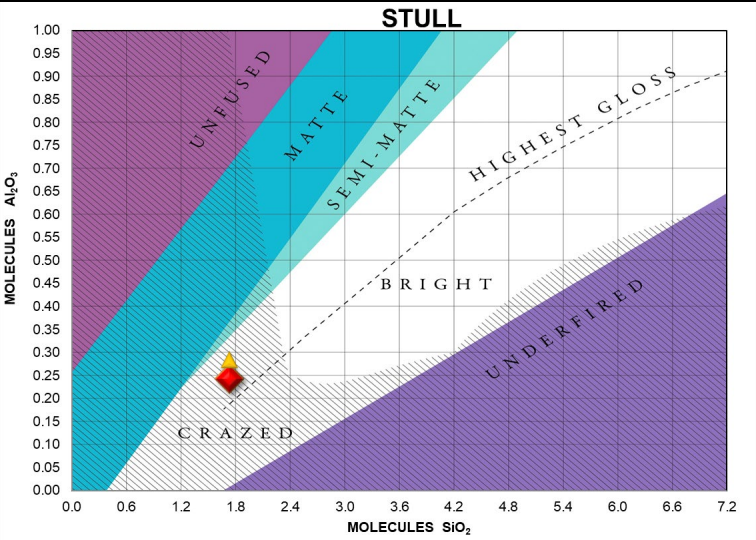
1-3 Second Dip



2-3 Second Dips



Reduction



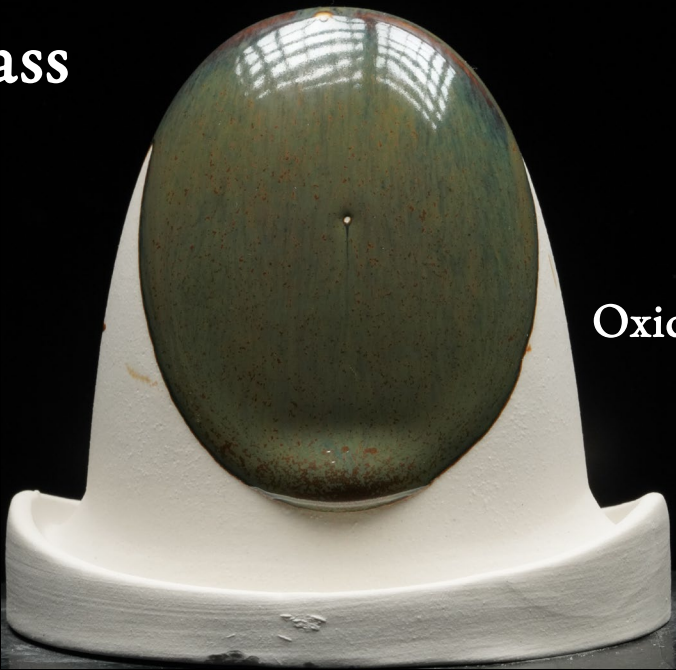
Ceramic  
Materials  
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# Heart of Glass

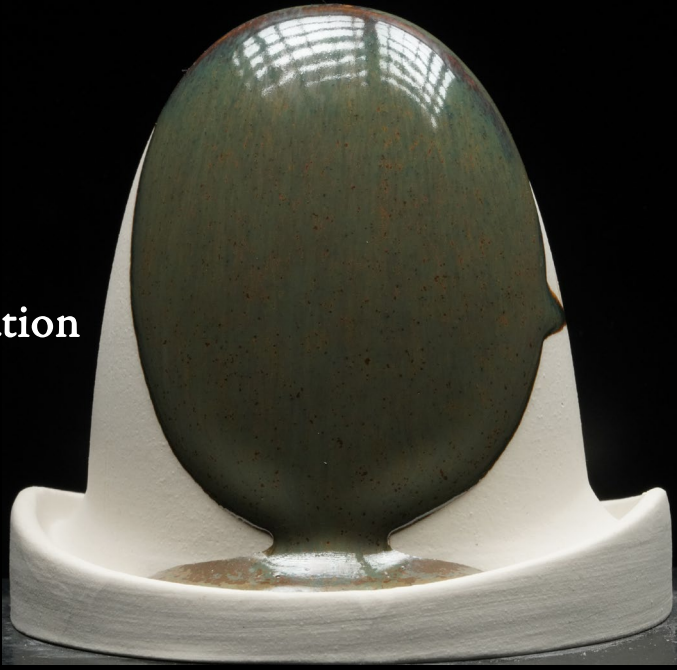
|                  |       |
|------------------|-------|
| Neph Sy          | 35.56 |
| Whiting          | 12.64 |
| Zinc Oxide       | 11.06 |
| EPK              | 7.98  |
| Flint            | 20.28 |
| Bentonite        | 1.77  |
| Red Iron Oxide   | 5.36  |
| Titanium Dioxide | 5.36  |
| Water            | 60    |

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>4.45 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.73                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.39 | Na <sub>2</sub> O<br>0.13      | K <sub>2</sub> O<br>0.04 | MgO<br>0.00             | CaO<br>0.28 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.24               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.15                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.30             | FeO<br>0.24 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO                     | CoO         |



Oxidation

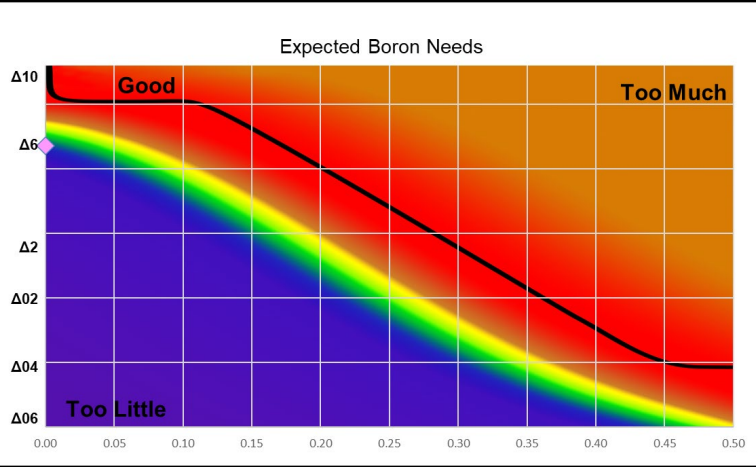
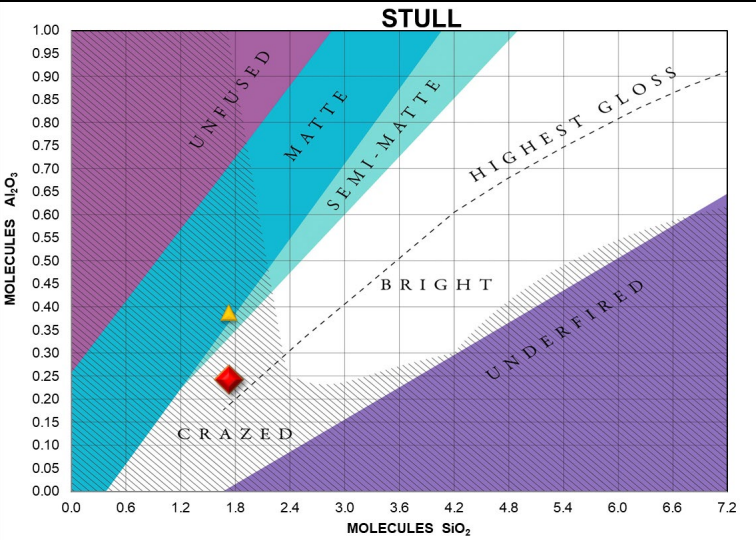
1-3 Second Dip



2-3 Second Dips



Reduction



Ceramic  
Materials  
Workshop



# Heart of Glass

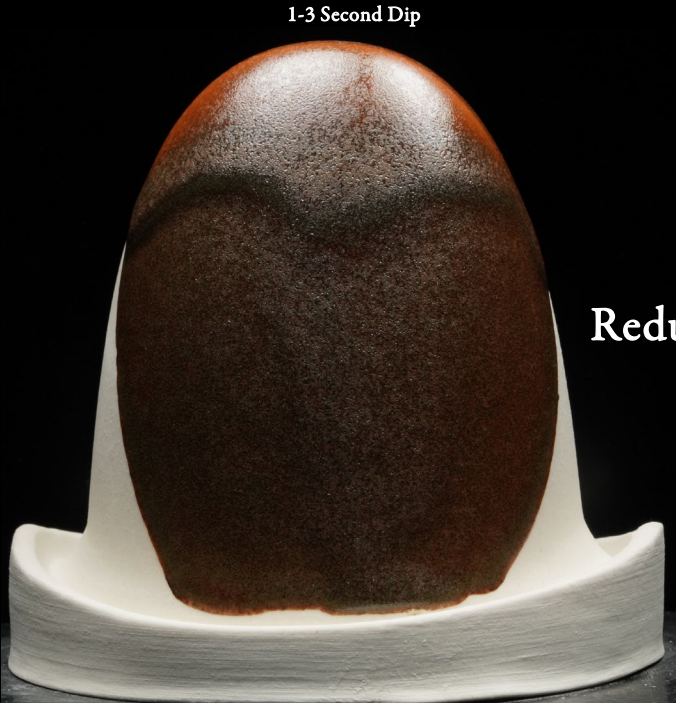
|                |       |
|----------------|-------|
| Neph Sy        | 35.88 |
| Whiting        | 12.76 |
| Zinc Oxide     | 11.16 |
| EPK            | 8.05  |
| Flint          | 20.46 |
| Bentonite      | 1.78  |
| Red Iron Oxide | 5.41  |
| Tin Oxide      | 4.50  |
| Water          | 60    |



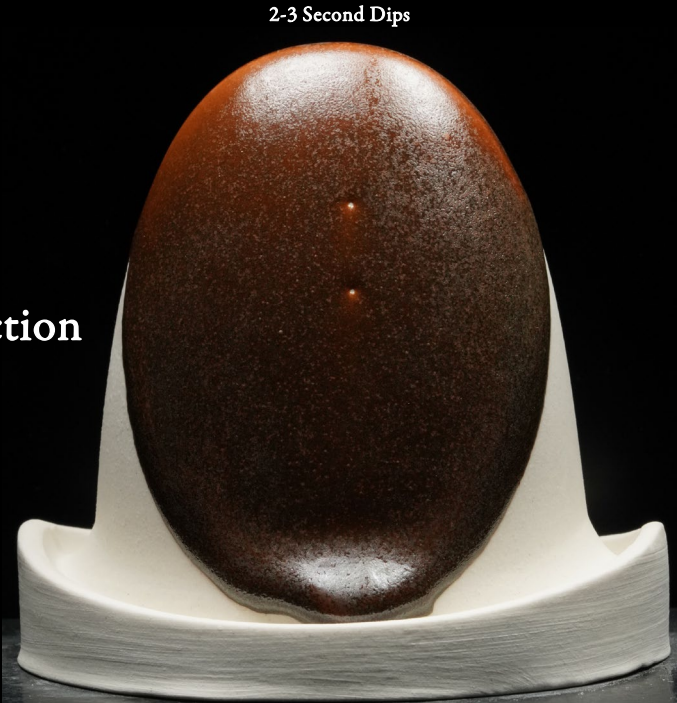
Oxidation



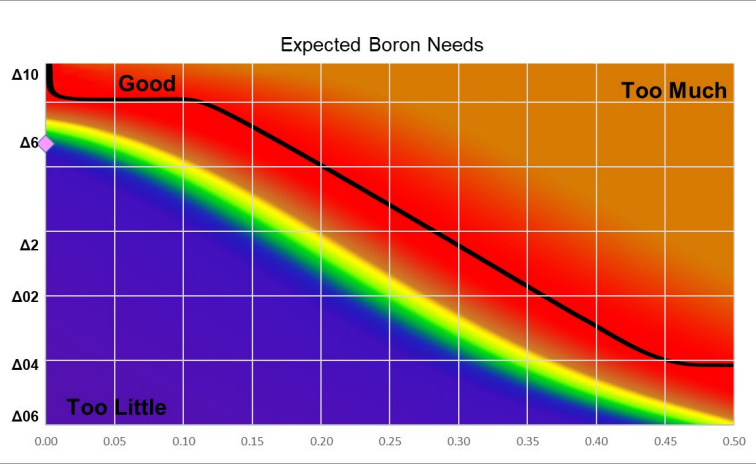
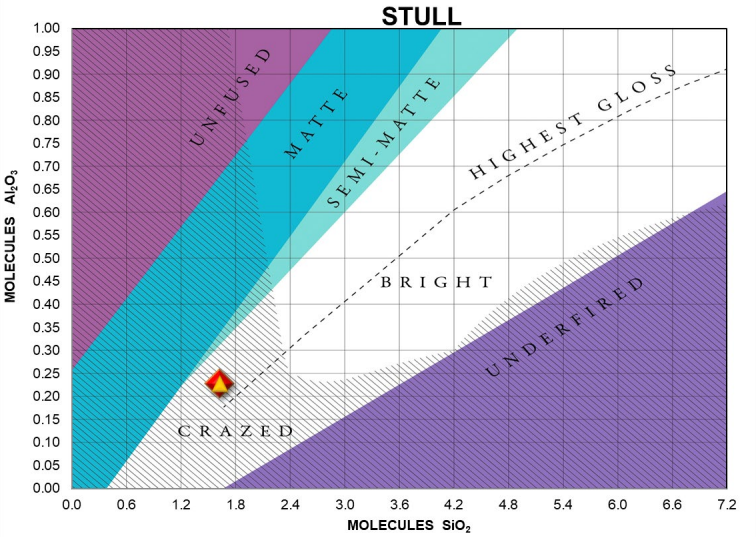
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.22          |                          | Alkaline Earths<br>0.78 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.63                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.23 | Na <sub>2</sub> O<br>0.12      | K <sub>2</sub> O<br>0.04 | MgO<br>0.00             | CaO<br>0.27 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.23               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub><br>0.06 | ZnO<br>0.28             | FeO<br>0.23 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |

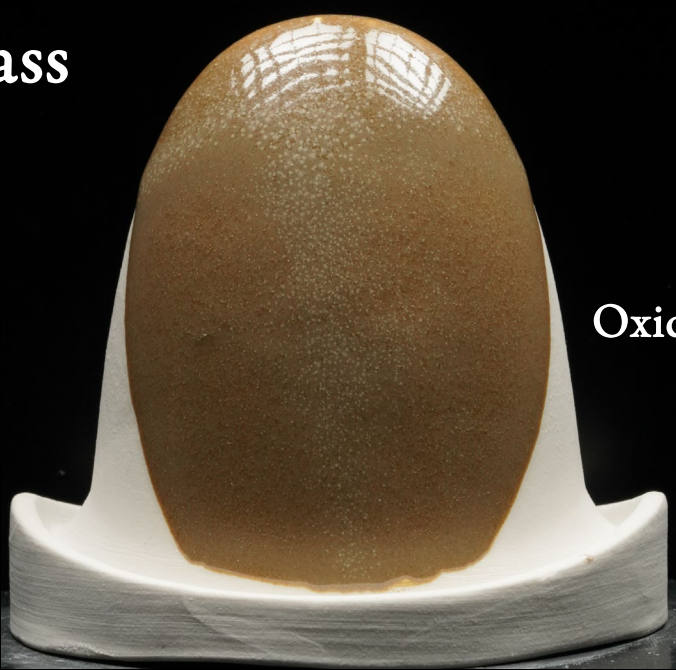


Ceramic  
Materials  
Workshop



# Heart of Glass

|                   |       |
|-------------------|-------|
| Neph Sy           | 34.33 |
| Whiting           | 12.21 |
| Zinc Oxide        | 10.68 |
| EPK               | 7.71  |
| Flint             | 19.58 |
| Bentonite         | 1.71  |
| Red Iron Oxide    | 5.17  |
| Ultrox (Zircopax) | 8.62  |
| Water             | 60    |



1-3 Second Dip



2-3 Second Dips

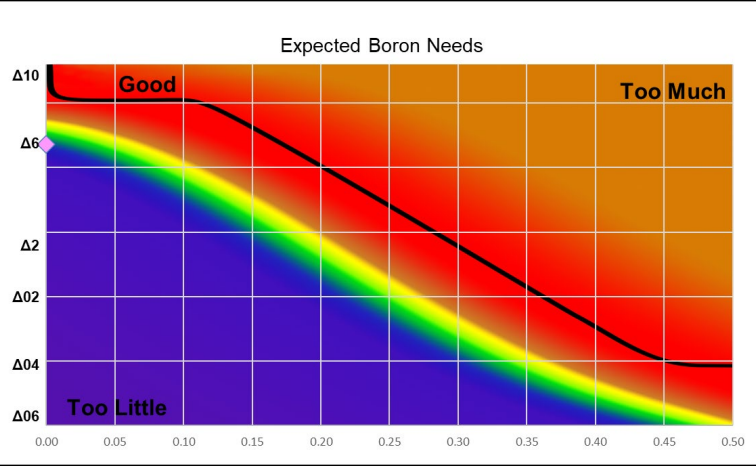
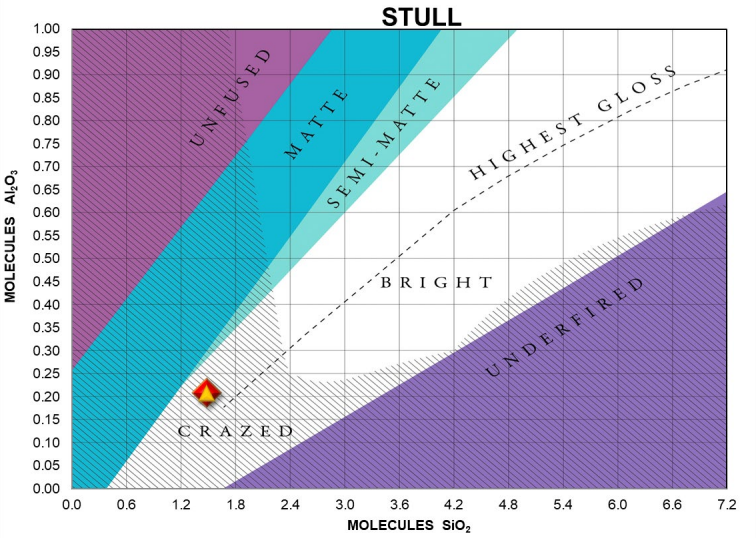


Reduction



Reduction

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.15          |                          | Alkaline Earths<br>0.85 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.49                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.21 | Na <sub>2</sub> O<br>0.11      | K <sub>2</sub> O<br>0.03 | MgO<br>0.00             | CaO<br>0.24 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.21               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.26             | FeO<br>0.21 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO<br>0.14 |



Ceramic  
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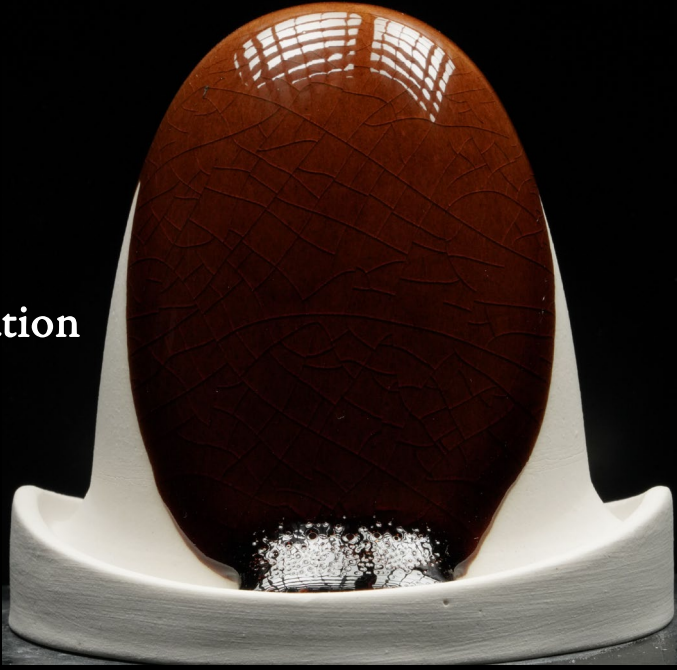


# Heart of Glass

|                     |       |
|---------------------|-------|
| Neph Sy             | 37.75 |
| Whiting             | 13.42 |
| Zinc Oxide          | 11.74 |
| EPK                 | 8.47  |
| Flint               | 21.53 |
| Bentonite           | 1.88  |
| Manganese Dioxide   | 2.84  |
| Nickel Carb (Green) | 2.37  |
| Water               | 60    |



1-3 Second Dip



2-3 Second Dips

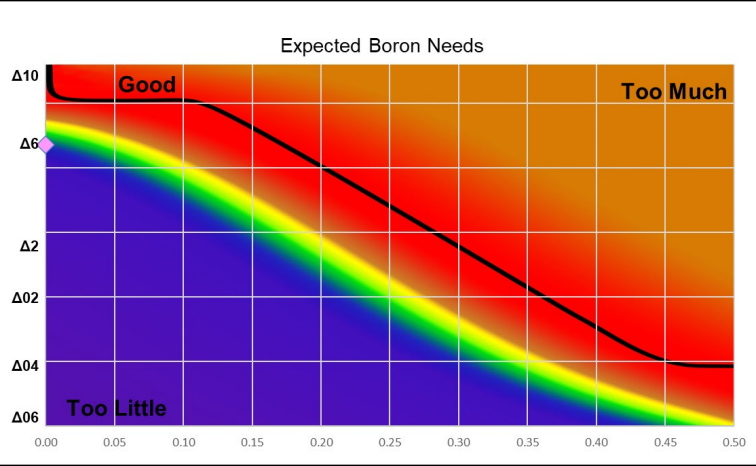
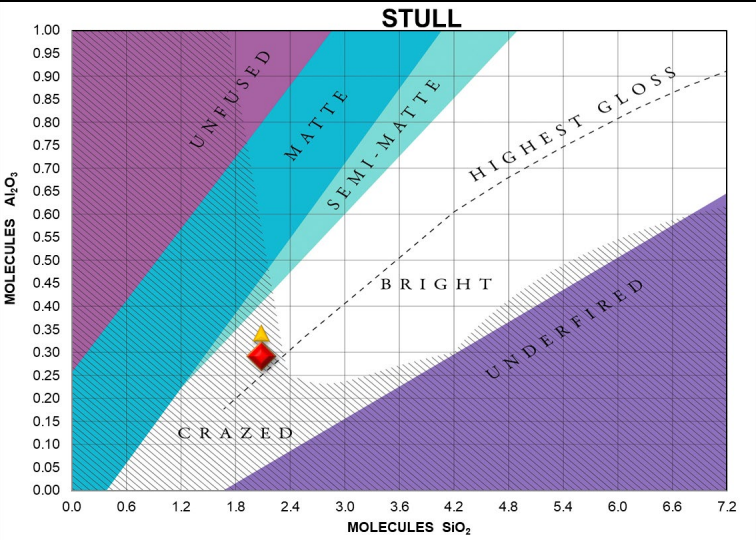


Reduction



Oxidation

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>6.09 : 1 |                                                      | Alkali Metals<br>0.20          |                          | Alkaline Earths<br>0.80  |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|--------------------------|-------------|
| SiO <sub>2</sub><br>2.09                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.34 | Na <sub>2</sub> O<br>0.16      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00              | CaO<br>0.34 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.29               | Li <sub>2</sub> O              | CuO                      | SrO                      | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO<br>0.05                                          | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.36              | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub><br>0.08 | CoO         |



Ceramic  
Materials  
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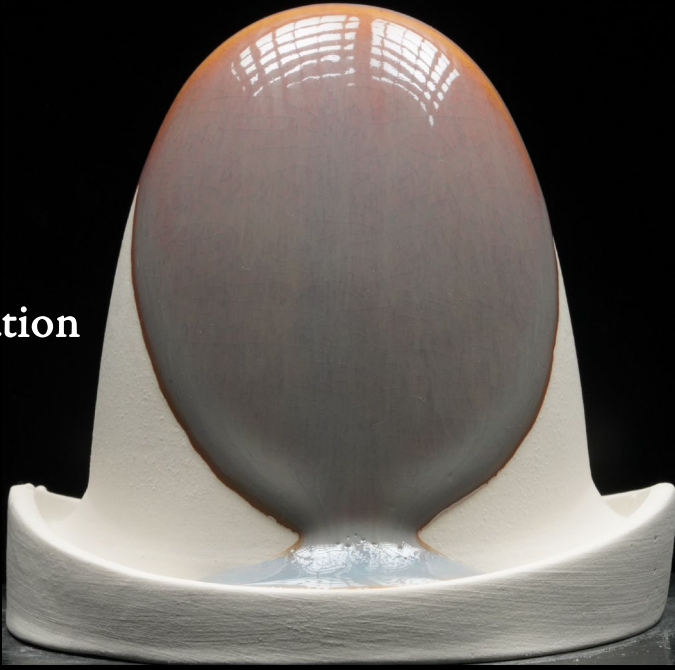


# Heart of Glass

|                   |       |
|-------------------|-------|
| Neph Sy           | 36.54 |
| Whiting           | 12.99 |
| Zinc Oxide        | 11.37 |
| EPK               | 8.20  |
| Flint             | 20.83 |
| Bentonite         | 1.82  |
| Manganese Dioxide | 2.75  |
| Titanium Dioxide  | 5.50  |
| Water             | 60    |



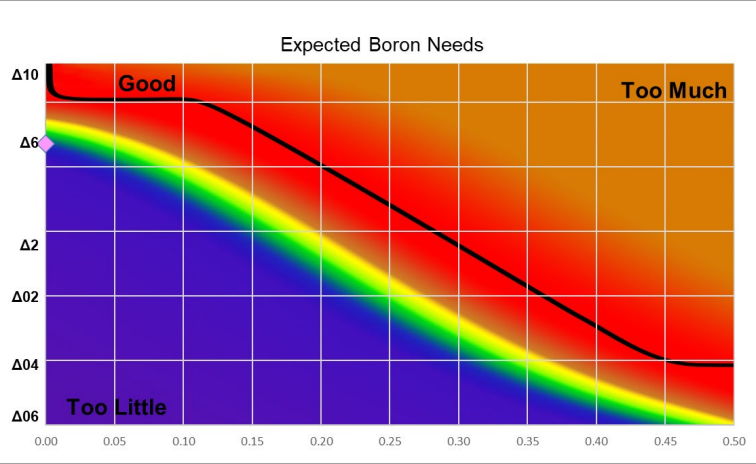
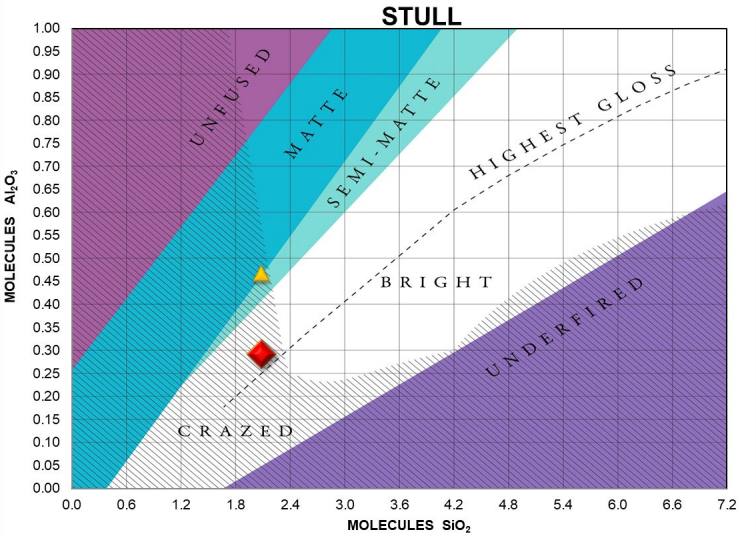
Oxidation



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>4.45 : 1 |                                                      | Alkali Metals<br>0.20          |                          | Alkaline Earths<br>0.80  |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|--------------------------|-------------|
| SiO <sub>2</sub><br>2.09                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.47 | Na <sub>2</sub> O<br>0.16      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00              | CaO<br>0.34 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.29               | Li <sub>2</sub> O              | CuO                      | SrO                      | BaO         |
| TiO <sub>2</sub><br>0.18                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.36              | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub><br>0.08 | CoO         |



Ceramic  
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# Heart of Glass

|                   |       |
|-------------------|-------|
| Neph Sy           | 36.87 |
| Whiting           | 13.11 |
| Zinc Oxide        | 11.47 |
| EPK               | 8.28  |
| Flint             | 21.03 |
| Bentonite         | 1.83  |
| Manganese Dioxide | 2.78  |
| Tin Oxide         | 4.63  |
| Water             | 60    |



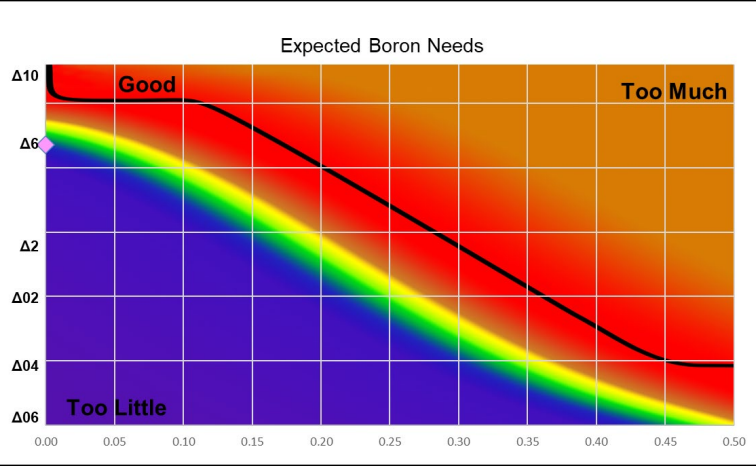
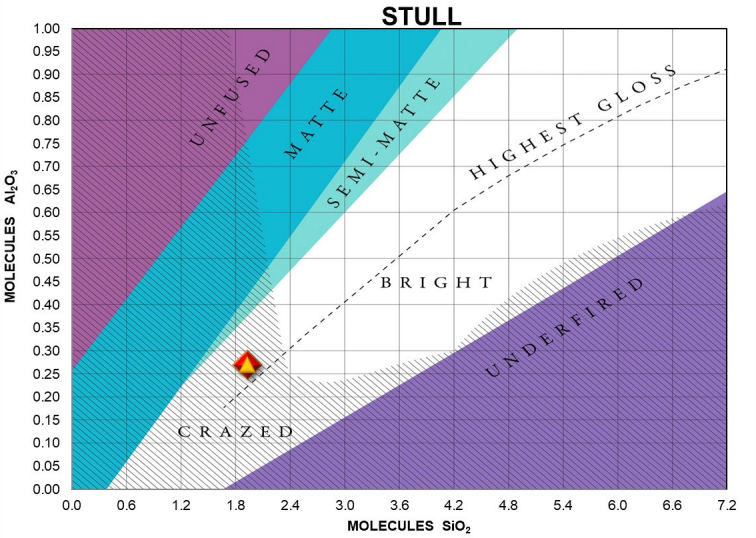
Oxidation



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.14 : 1 |                                                      | Alkali Metals<br>0.26          |                          | Alkaline Earths<br>0.74  |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|--------------------------|-------------|
| SiO <sub>2</sub><br>1.93                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.27 | Na <sub>2</sub> O<br>0.15      | K <sub>2</sub> O<br>0.04 | MgO<br>0.00              | CaO<br>0.32 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.27               | Li <sub>2</sub> O              | CuO                      | SrO                      | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub><br>0.07 | ZnO<br>0.34              | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub><br>0.08 | CoO         |

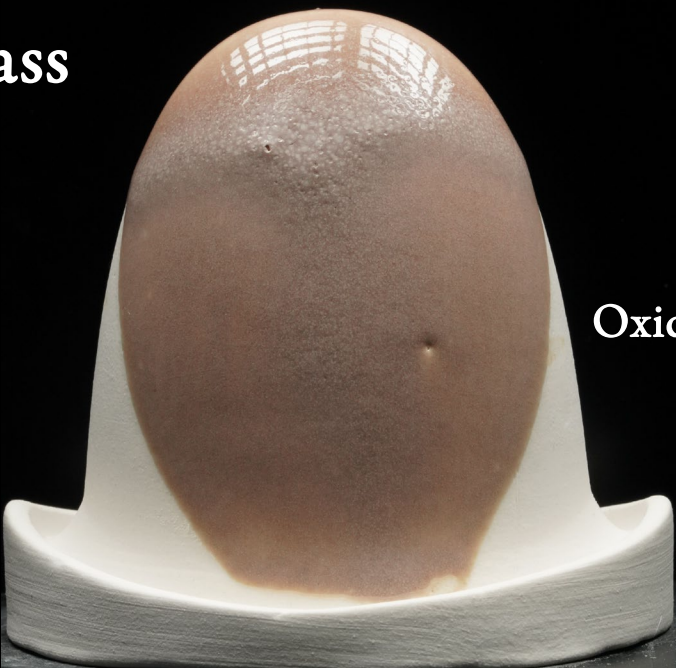


Ceramic  
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# Heart of Glass

|                   |       |
|-------------------|-------|
| Neph Sy           | 35.24 |
| Whiting           | 12.53 |
| Zinc Oxide        | 10.96 |
| EPK               | 7.91  |
| Flint             | 20.10 |
| Bentonite         | 1.75  |
| Manganese Dioxide | 2.65  |
| Ultrox (Zircopax) | 8.85  |
| Water             | 60    |



1-3 Second Dip



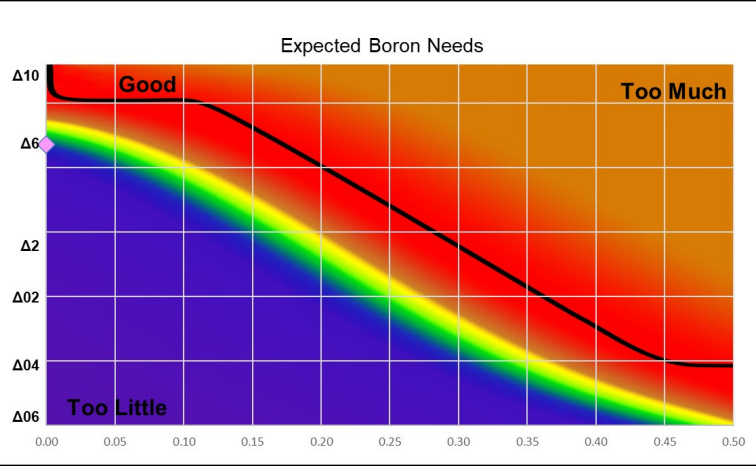
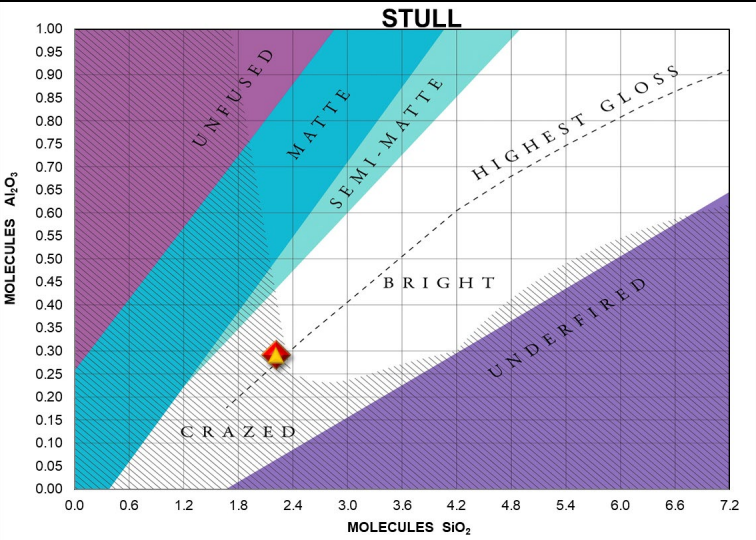
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.58 : 1 |                                                      | Alkali Metals<br>0.20          |                          | Alkaline Earths<br>0.80  |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|--------------------------|-------------|
| SiO <sub>2</sub><br>2.22                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.29 | Na <sub>2</sub> O<br>0.16      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00              | CaO<br>0.34 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.29               | Li <sub>2</sub> O              | CuO                      | SrO                      | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.36              | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub><br>0.08 | CoO         |

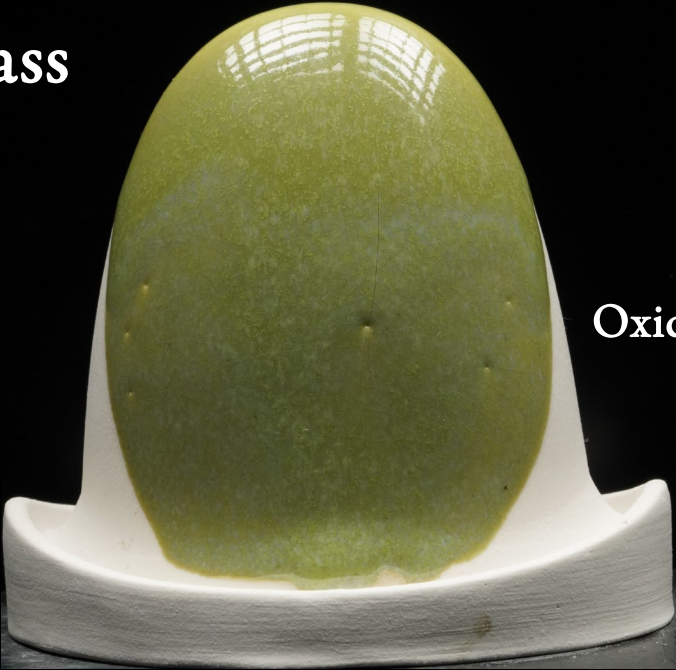


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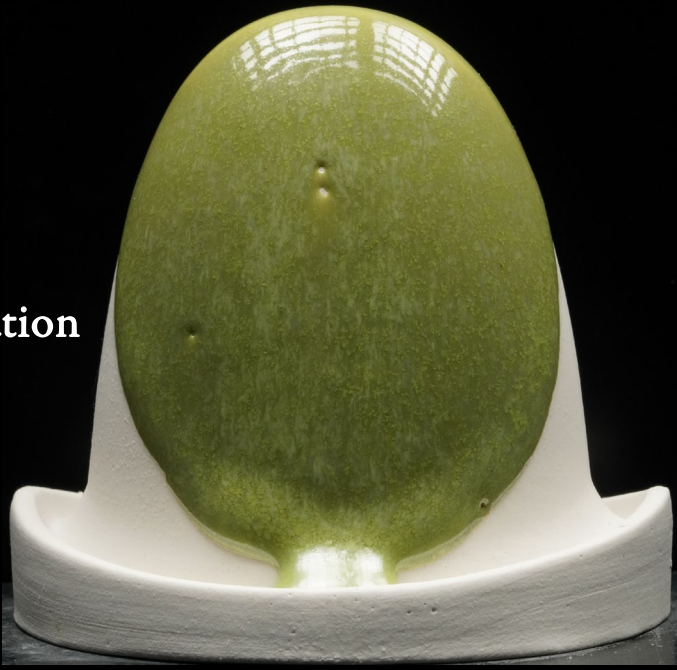


# Heart of Glass

|                     |       |
|---------------------|-------|
| Neph Sy             | 36.70 |
| Whiting             | 13.05 |
| Zinc Oxide          | 11.42 |
| EPK                 | 8.24  |
| Flint               | 20.93 |
| Bentonite           | 1.82  |
| Nickel Carb (Green) | 2.30  |
| Titanium Dioxide    | 5.53  |
| Water               | 60    |



1-3 Second Dip



2-3 Second Dips



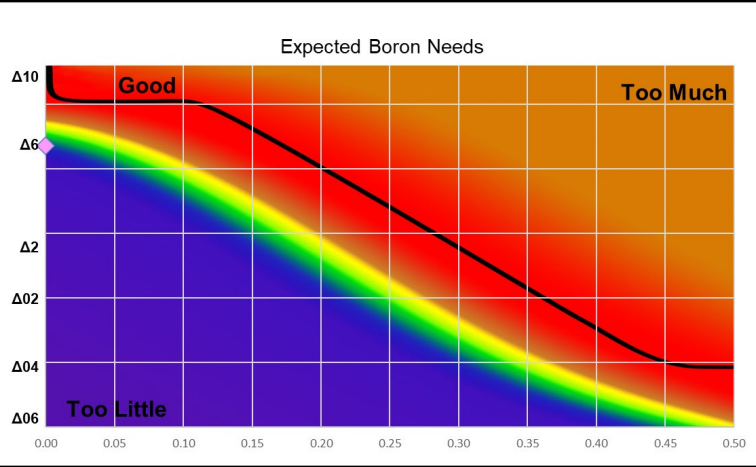
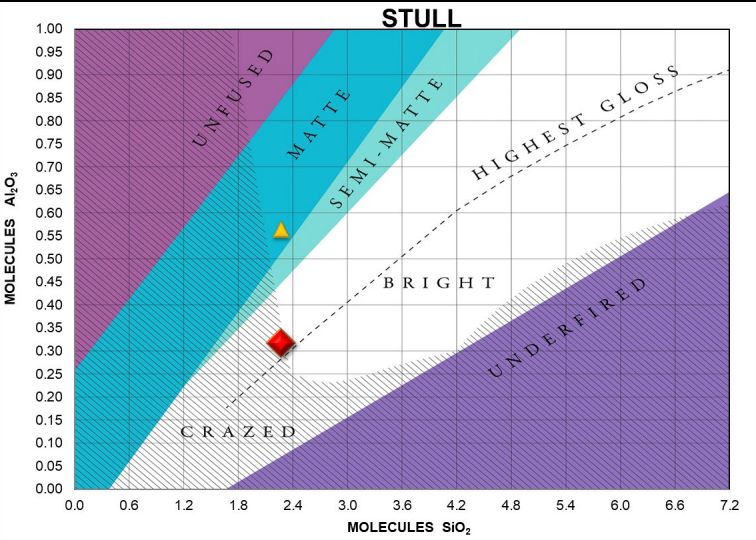
Reduction



Reduction

Oxidation

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>4.02 : 1 |                                                      | Alkali Metals<br>0.22          |                          | Alkaline Earths<br>0.78 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.27                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.56 | Na <sub>2</sub> O<br>0.17      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.37 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.32               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.19                                           | NiO<br>0.05                                          | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.39             | FeO<br>0.01 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |

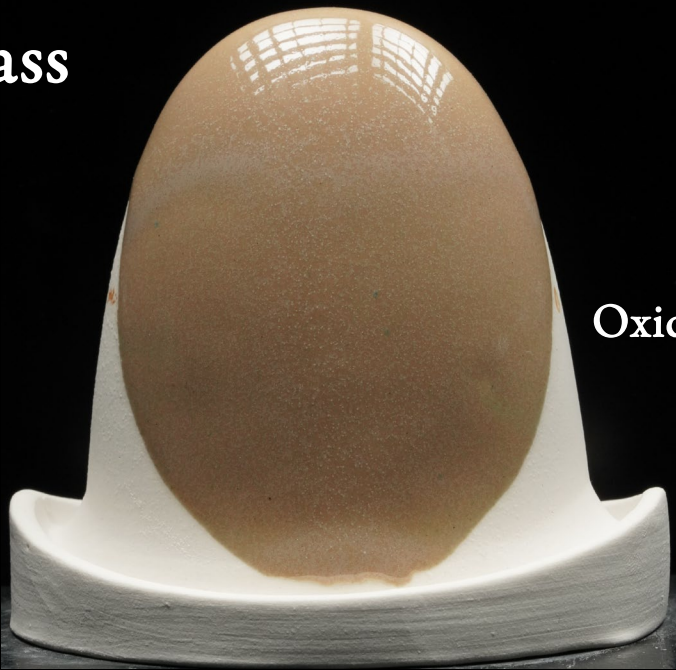


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# Heart of Glass

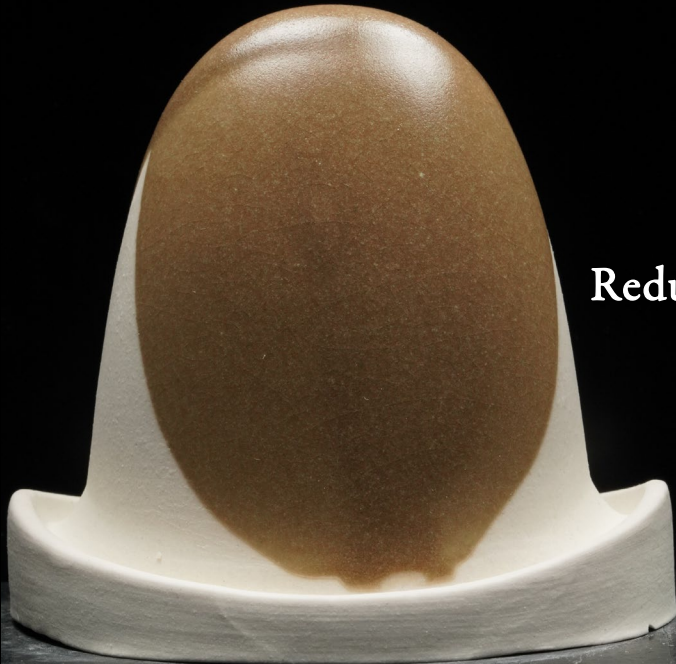
|                     |       |
|---------------------|-------|
| Neph Sy             | 37.05 |
| Whiting             | 13.17 |
| Zinc Oxide          | 11.53 |
| EPK                 | 8.31  |
| Flint               | 21.12 |
| Bentonite           | 1.84  |
| Nickel Carb (Green) | 2.33  |
| Tin Oxide           | 4.65  |
| Water               | 60    |



1-3 Second Dip



2-3 Second Dips

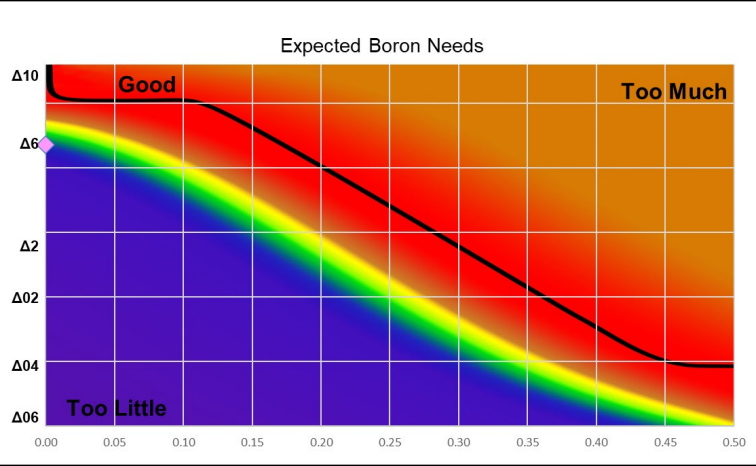
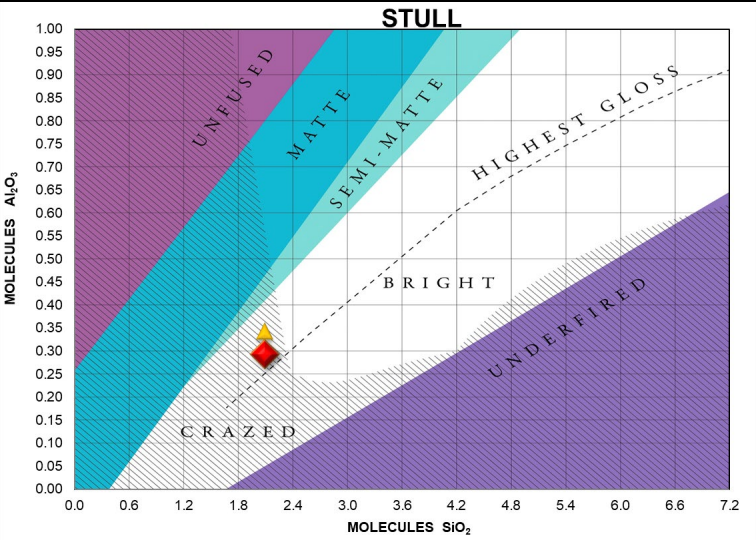


Reduction



Oxidation

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>6.09 : 1 |                                                      | Alkali Metals<br>0.28          |                          | Alkaline Earths<br>0.72 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.09                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.34 | Na <sub>2</sub> O<br>0.16      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.34 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.29               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO<br>0.05                                          | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub><br>0.08 | ZnO<br>0.36             | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



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# Heart of Glass

|                     |       |
|---------------------|-------|
| Neph Sy             | 35.40 |
| Whiting             | 12.59 |
| Zinc Oxide          | 11.01 |
| EPK                 | 7.95  |
| Flint               | 20.19 |
| Bentonite           | 1.76  |
| Nickel Carb (Green) | 2.22  |
| Ultrox (Zircopax)   | 8.89  |
| Water               | 60    |



1-3 Second Dip



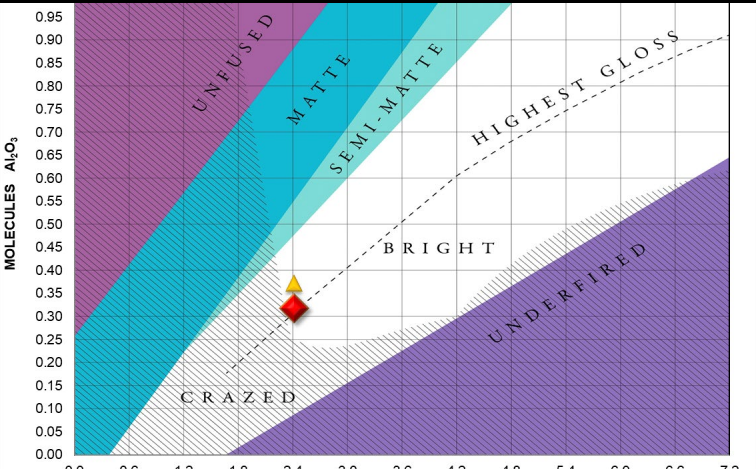
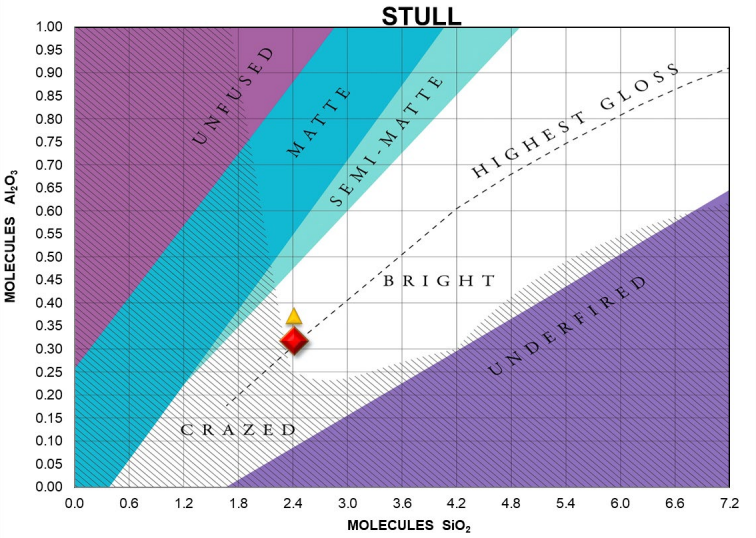
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>6.47 : 1 |                                                      | Alkali Metals<br>0.22          |                          | Alkaline Earths<br>0.78 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.41                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.37 | Na <sub>2</sub> O<br>0.17      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.37 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.32               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO<br>0.05                                          | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.39             | FeO<br>0.01 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



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# Heart of Glass

|                  |       |
|------------------|-------|
| Neph Sy          | 35.88 |
| Whiting          | 12.76 |
| Zinc Oxide       | 11.16 |
| EPK              | 8.05  |
| Flint            | 20.46 |
| Bentonite        | 1.78  |
| Titanium Dioxide | 5.41  |
| Tin Oxide        | 4.50  |
| Water            | 60    |



1-3 Second Dip



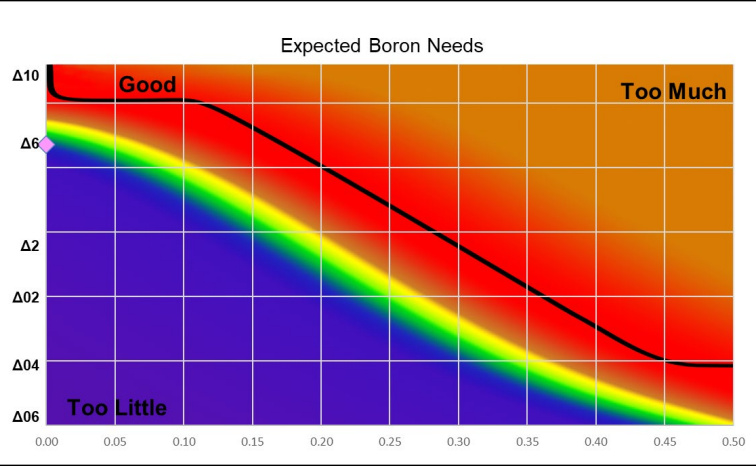
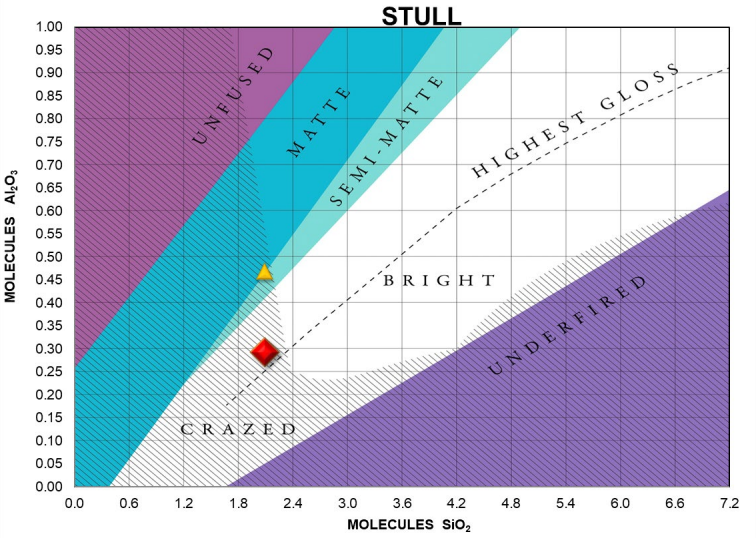
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>4.45 : 1 |                                                      | Alkali Metals<br>0.28          |                          | Alkaline Earths<br>0.72 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.09                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.47 | Na <sub>2</sub> O<br>0.16      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.34 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.29               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.18                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub><br>0.08 | ZnO<br>0.36             | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |

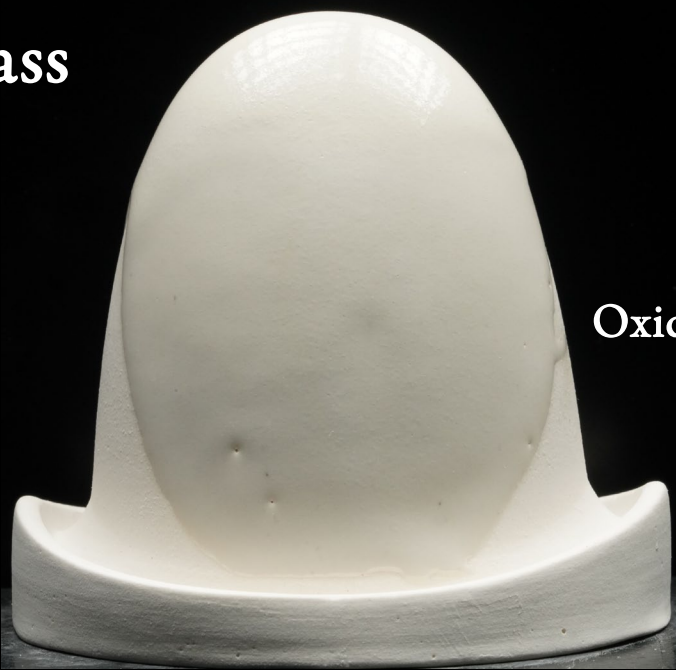


Ceramic  
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# Heart of Glass

|                   |       |
|-------------------|-------|
| Neph Sy           | 34.33 |
| Whiting           | 12.21 |
| Zinc Oxide        | 10.68 |
| EPK               | 7.71  |
| Flint             | 19.58 |
| Bentonite         | 1.71  |
| Titanium Dioxide  | 5.17  |
| Ultrax (Zircopax) | 8.62  |
| Water             | 60    |



1-3 Second Dip



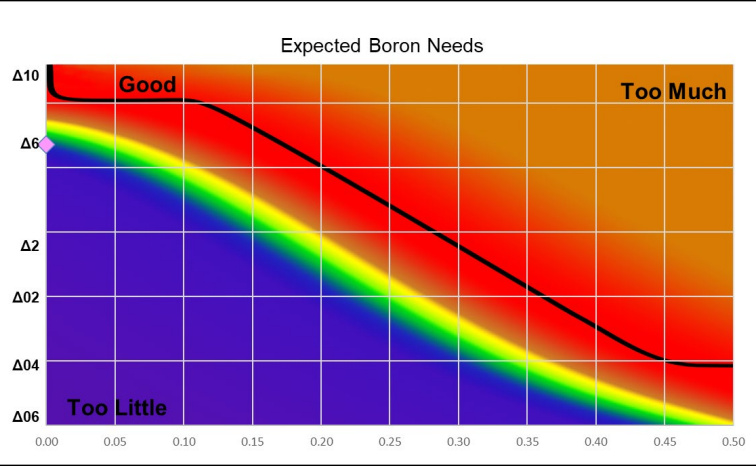
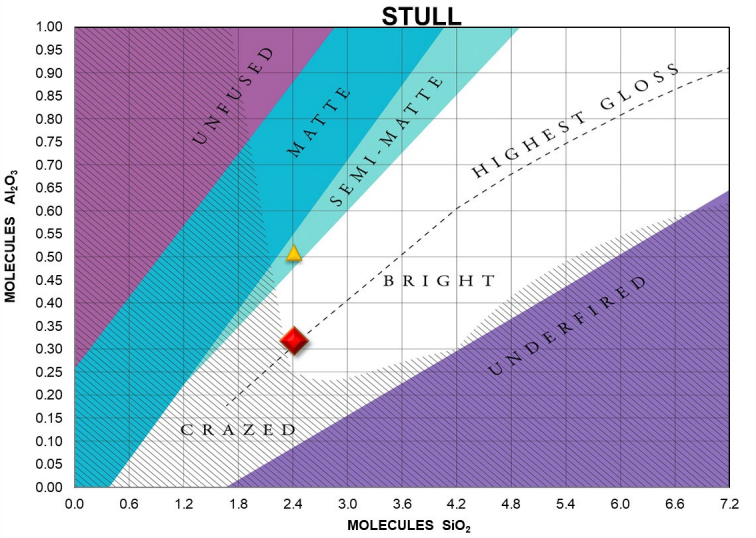
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>4.73 : 1 |                                                      | Alkali Metals<br>0.22          |                          | Alkaline Earths<br>0.78 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.41                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.51 | Na <sub>2</sub> O<br>0.17      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.37 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.32               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.19                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub>         | ZnO<br>0.39             | FeO<br>0.01 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



Ceramic  
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# Heart of Glass

|                   |       |
|-------------------|-------|
| Neph Sy           | 34.63 |
| Whiting           | 12.31 |
| Zinc Oxide        | 10.77 |
| EPK               | 7.77  |
| Flint             | 19.75 |
| Bentonite         | 1.72  |
| Tin Oxide         | 4.35  |
| Ultrox (Zircopax) | 8.70  |
| Water             | 60    |



1-3 Second Dip



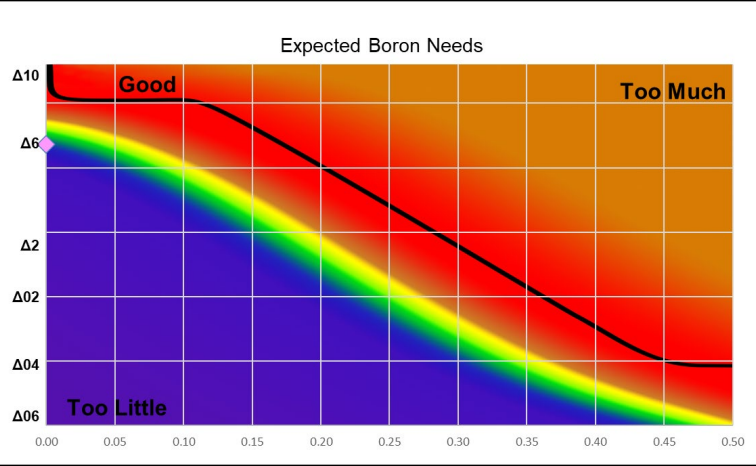
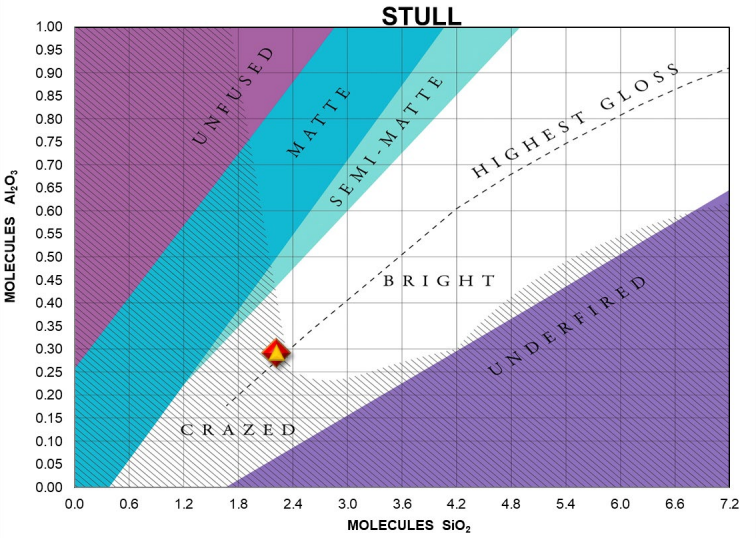
2-3 Second Dips



Reduction



| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.58 : 1 |                                                      | Alkali Metals<br>0.28          |                          | Alkaline Earths<br>0.72 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.22                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.29 | Na <sub>2</sub> O<br>0.16      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.34 |
| B <sub>2</sub> O <sub>3</sub>                                      | Al <sub>2</sub> O <sub>3</sub><br>0.29               | Li <sub>2</sub> O              | CuO                      | SrO                     | BaO         |
| TiO <sub>2</sub><br>0.00                                           | NiO                                                  | Bi <sub>2</sub> O <sub>3</sub> | SnO <sub>2</sub><br>0.08 | ZnO<br>0.36             | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub>                                     | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



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