

# Big Red- $\Delta 6$

Lab 3-Sili-Closeness

# Big Red

Original

070822 -1

|              |       |
|--------------|-------|
| G200 EU      | 23.37 |
| Whiting      | 27.11 |
| EPK          | 11.17 |
| Flint        | 12.73 |
| 3134         | 25.62 |
| Chrome Oxide | 0.10  |
| Tin Oxide    | 8.00  |
| Water        | 60    |



1-3 Second Dip



2-3 Second Dips



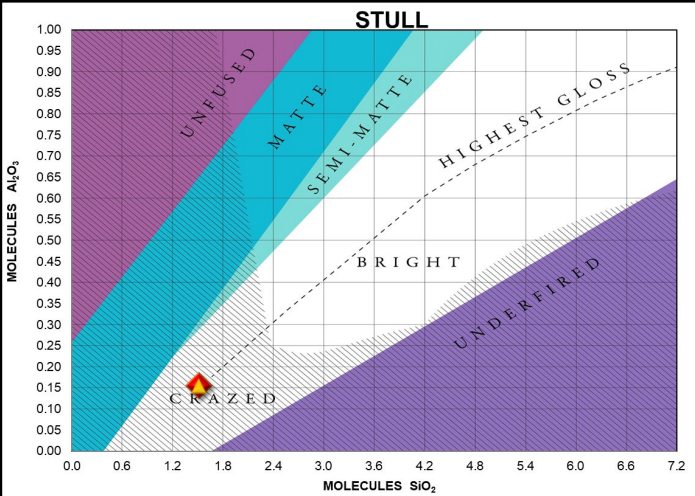
Reduction



Oxidation

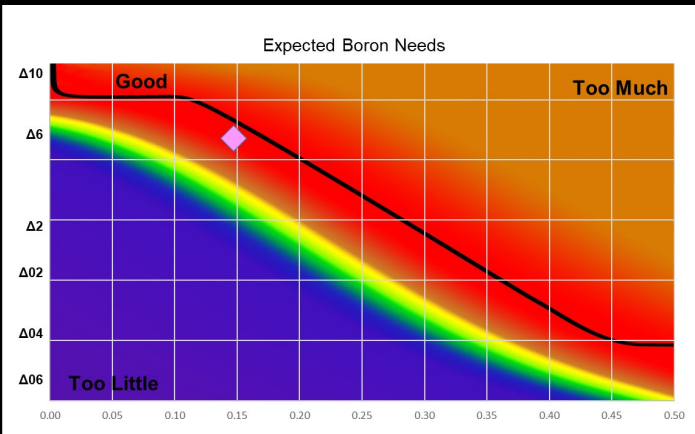
UMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>9.75 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.69                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.17 | Na <sub>2</sub> O<br>0.11      | K <sub>2</sub> O<br>0.06 | MgO<br>0.00             | CaO<br>0.82 |
| B <sub>2</sub> O <sub>3</sub><br>0.16                              | Al <sub>2</sub> O <sub>3</sub><br>0.17               | 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                     | 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         |



EUMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>9.75 : 1 |                                                      | Alkali Metals<br>0.26          |                          | Alkaline Earths<br>0.74 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.52                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.16 | Na <sub>2</sub> O<br>0.10      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.74 |
| B <sub>2</sub> O <sub>3</sub><br>0.15                              | Al <sub>2</sub> O <sub>3</sub><br>0.15               | 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>0.10 | ZnO                     | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.00                             | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |

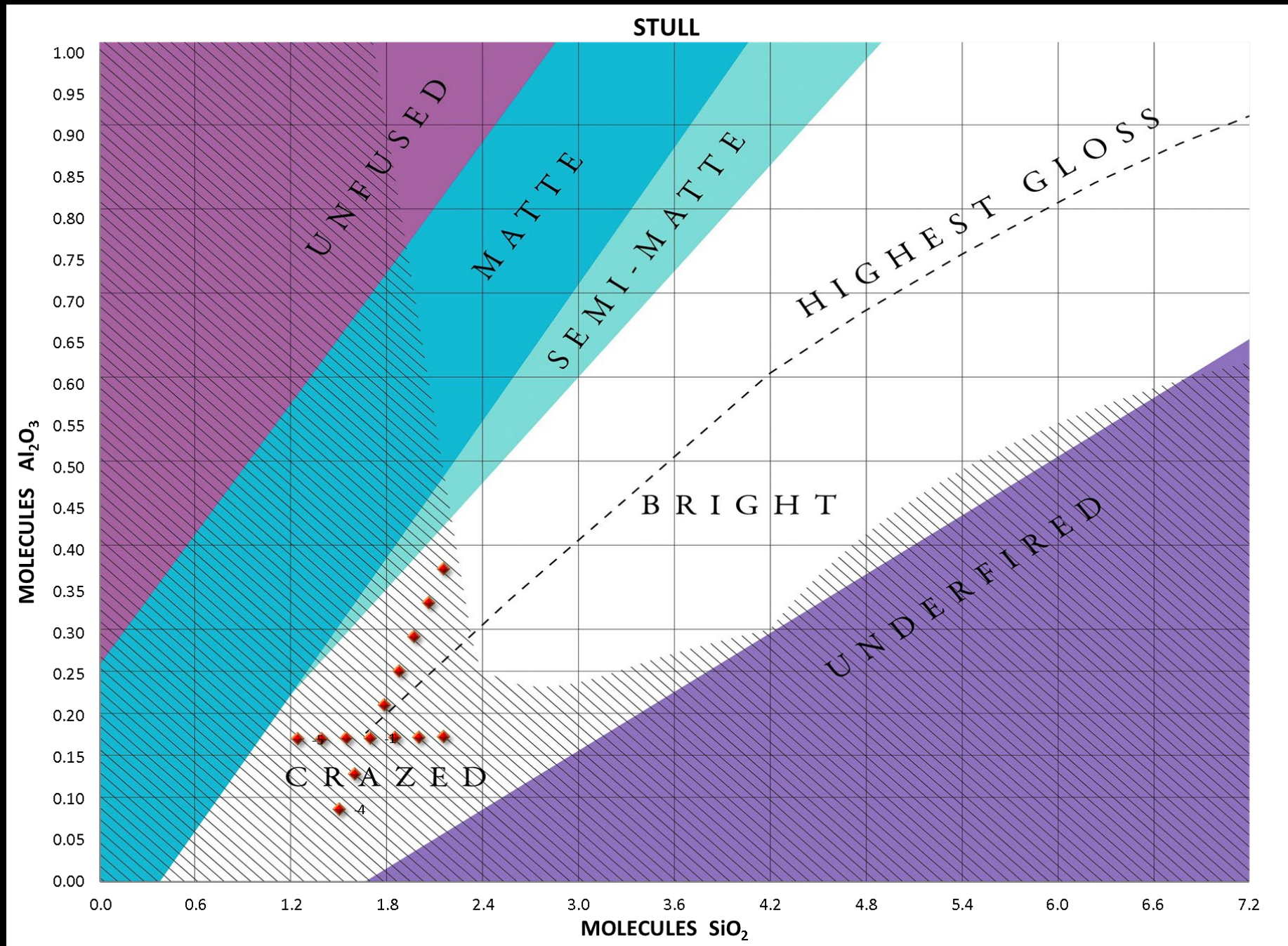


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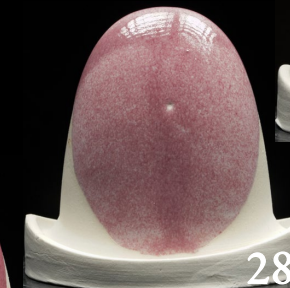
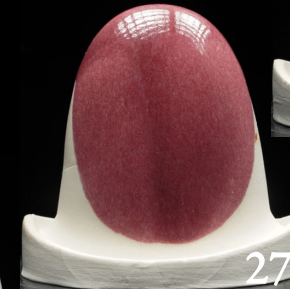
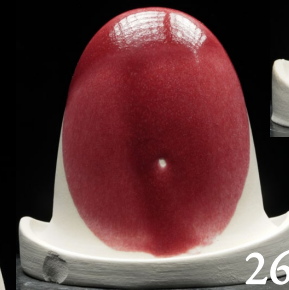
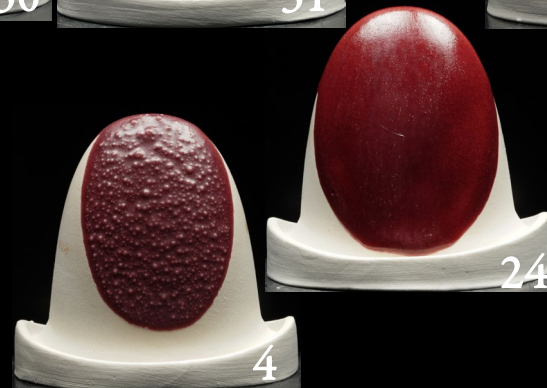
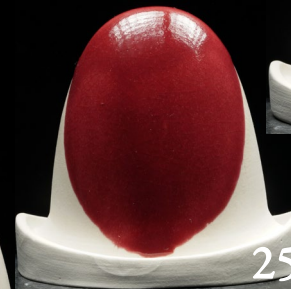
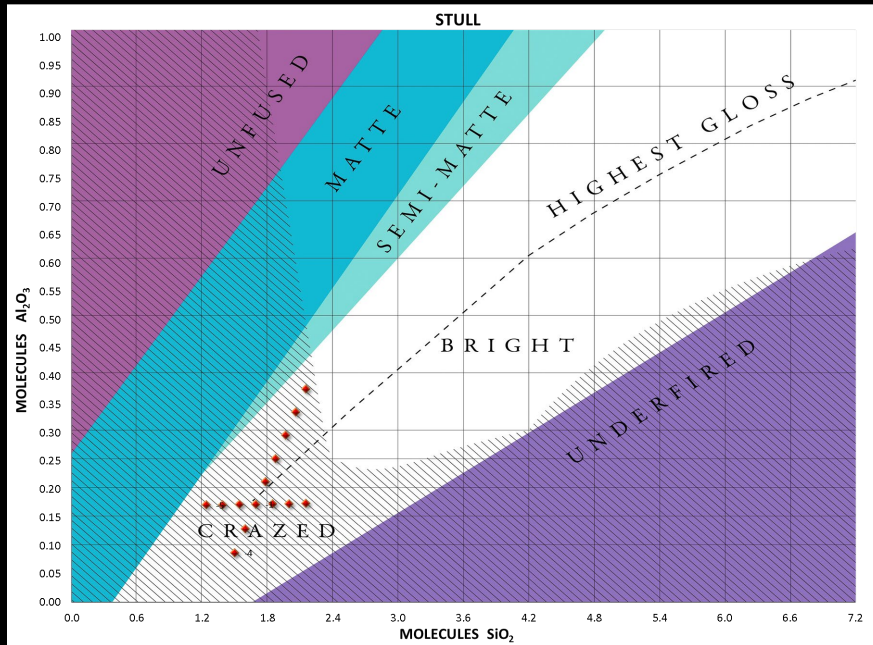
# UMF



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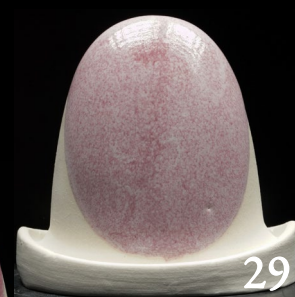
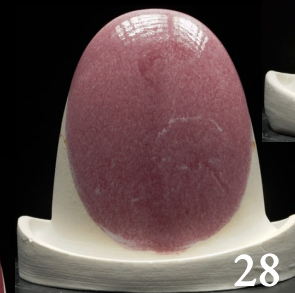
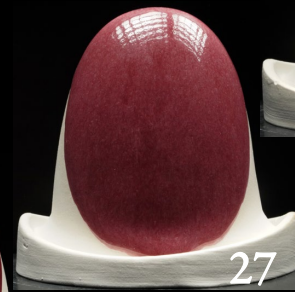
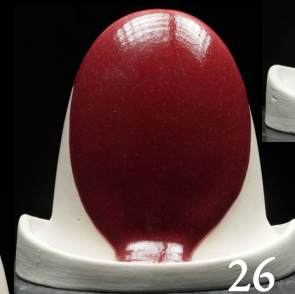
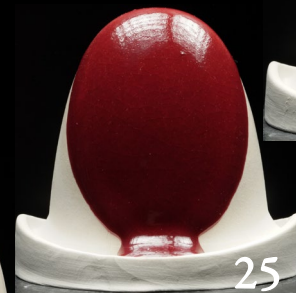
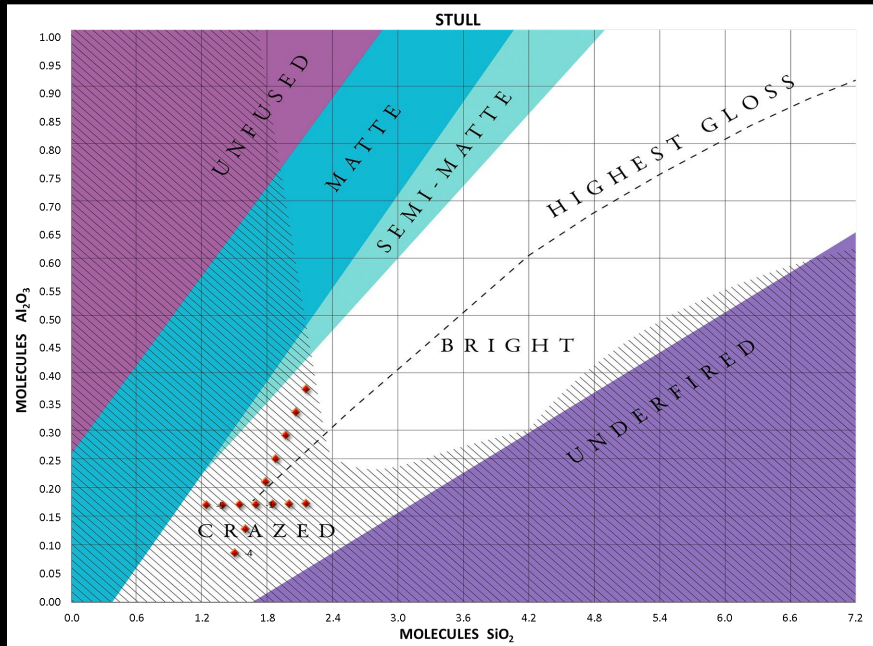
# Full Test-Oxidation-1-3 Second Dip



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# Full Test-Oxidation-2-3 Second Dips



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# Silica Variations-Oxidation



070822-5



070822-30



070822-31



070822-1



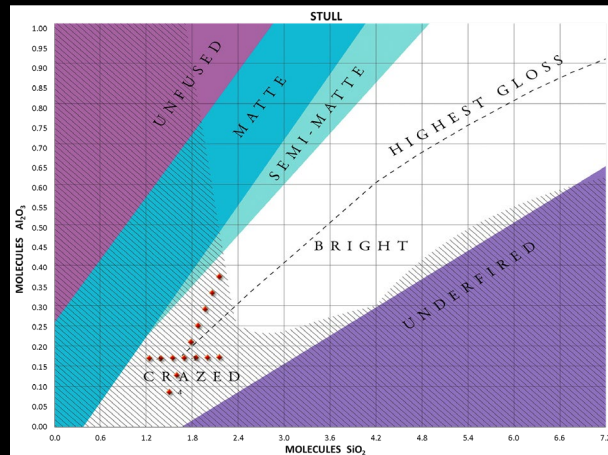
070822-32



070822-33

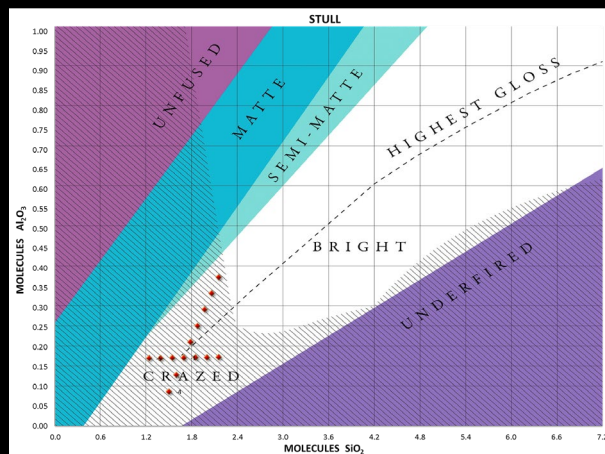
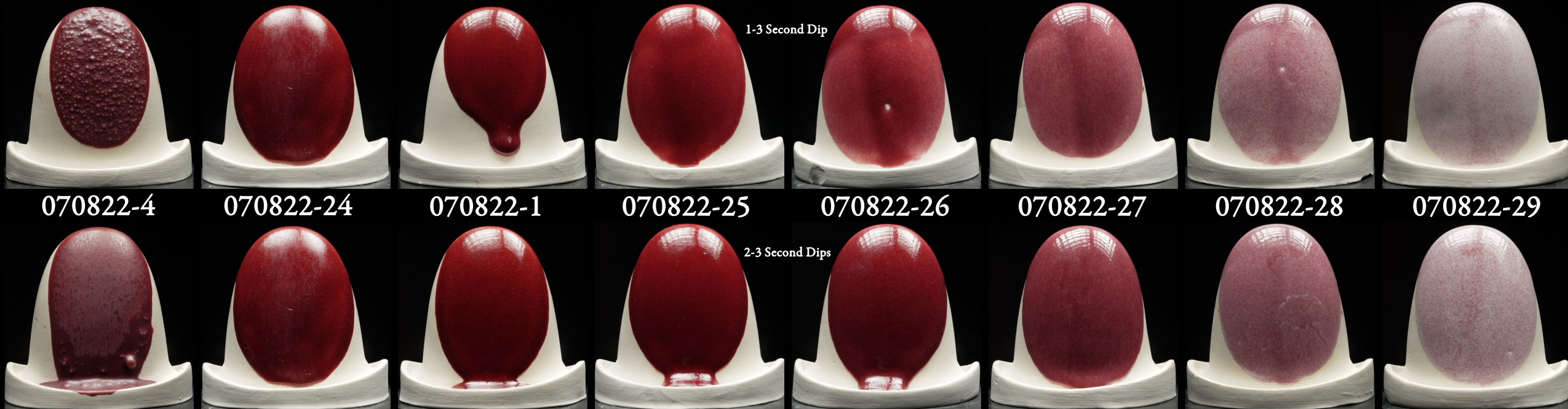


070822-34



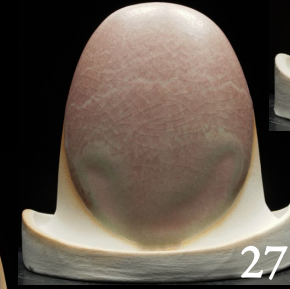
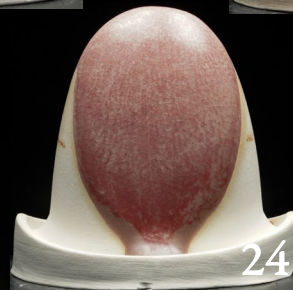
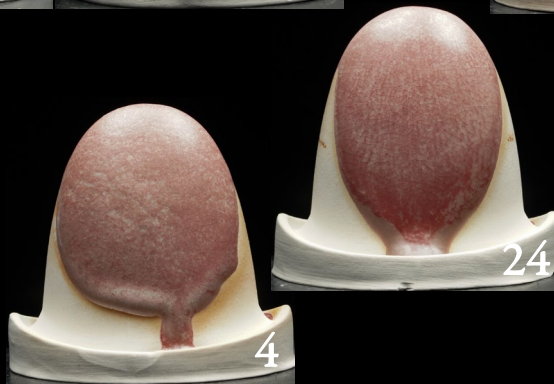
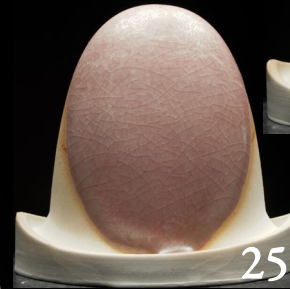
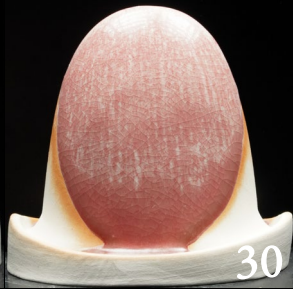
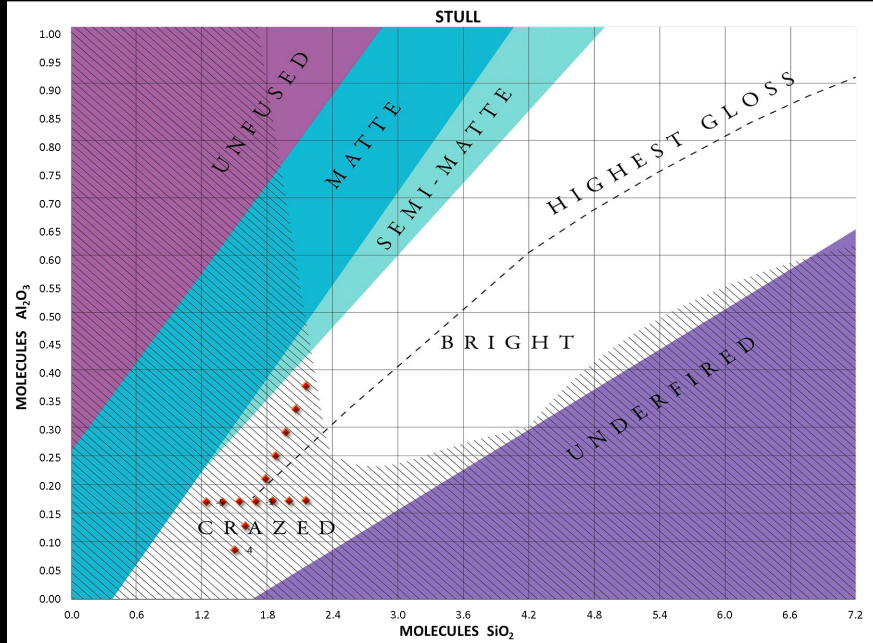
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# Alumina Variations-Oxidation

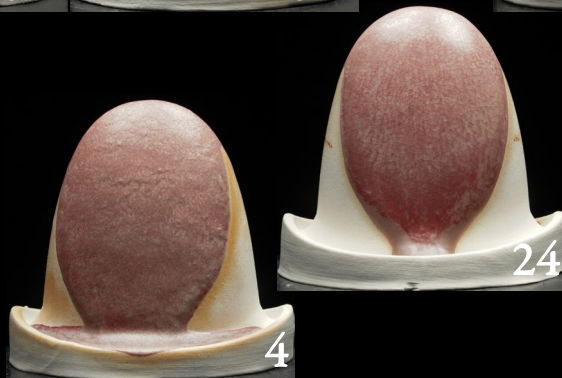
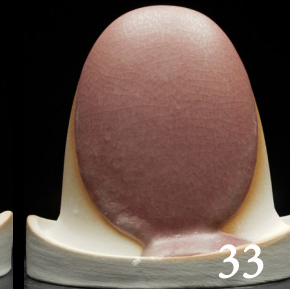
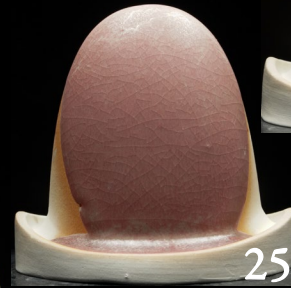
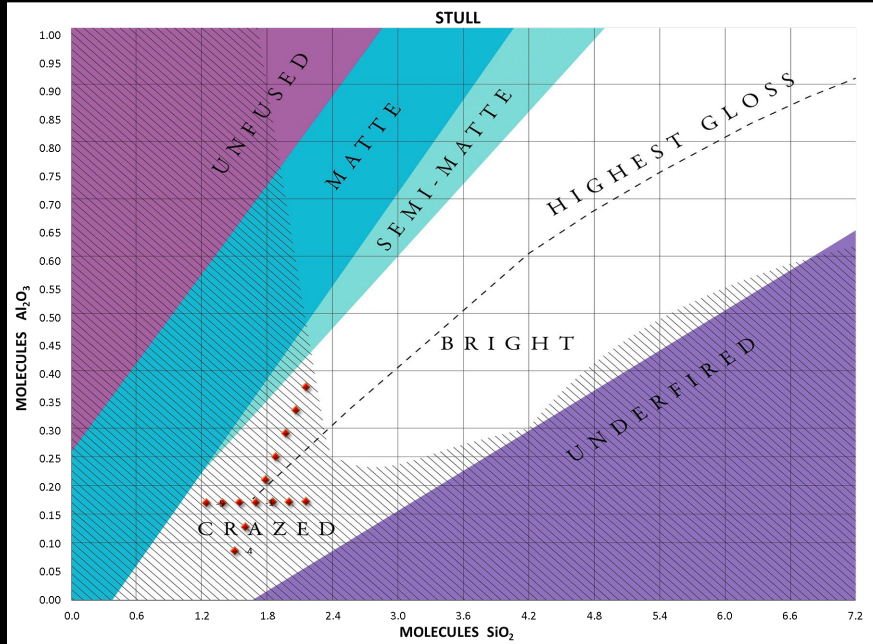


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# Full Test-Reduction-1-3 Second Dip



# Full Test-Reduction-2-3 Second Dips



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# Silica Variations-Reduction



070822-5



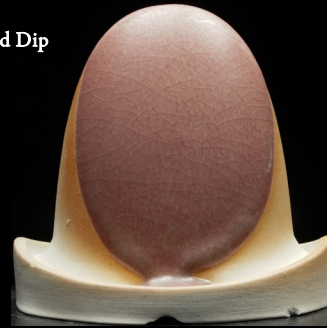
070822-24



070822-25



070822-1



070822-26

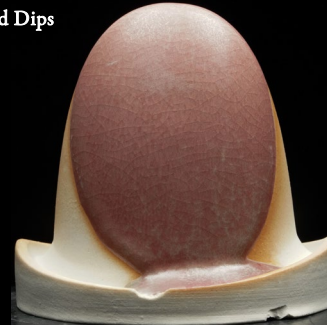
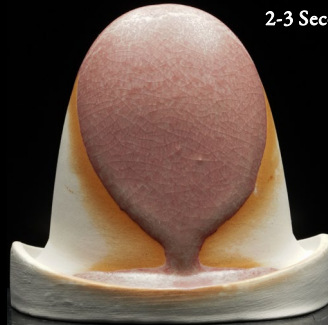


070822-27



070822-28

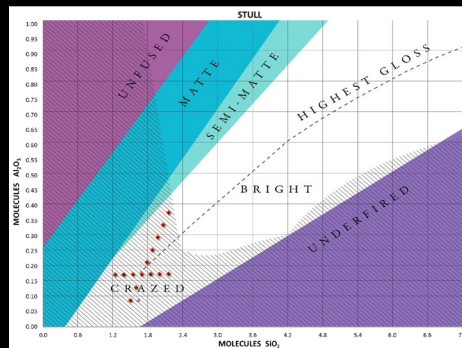
1-3 Second Dip



2-3 Second Dips

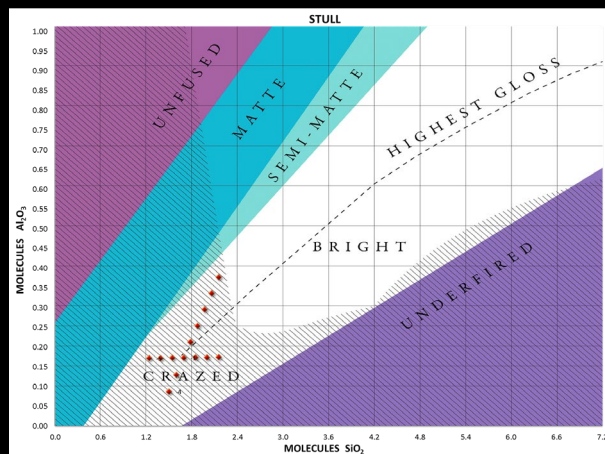


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# Alumina Variations-Reduction

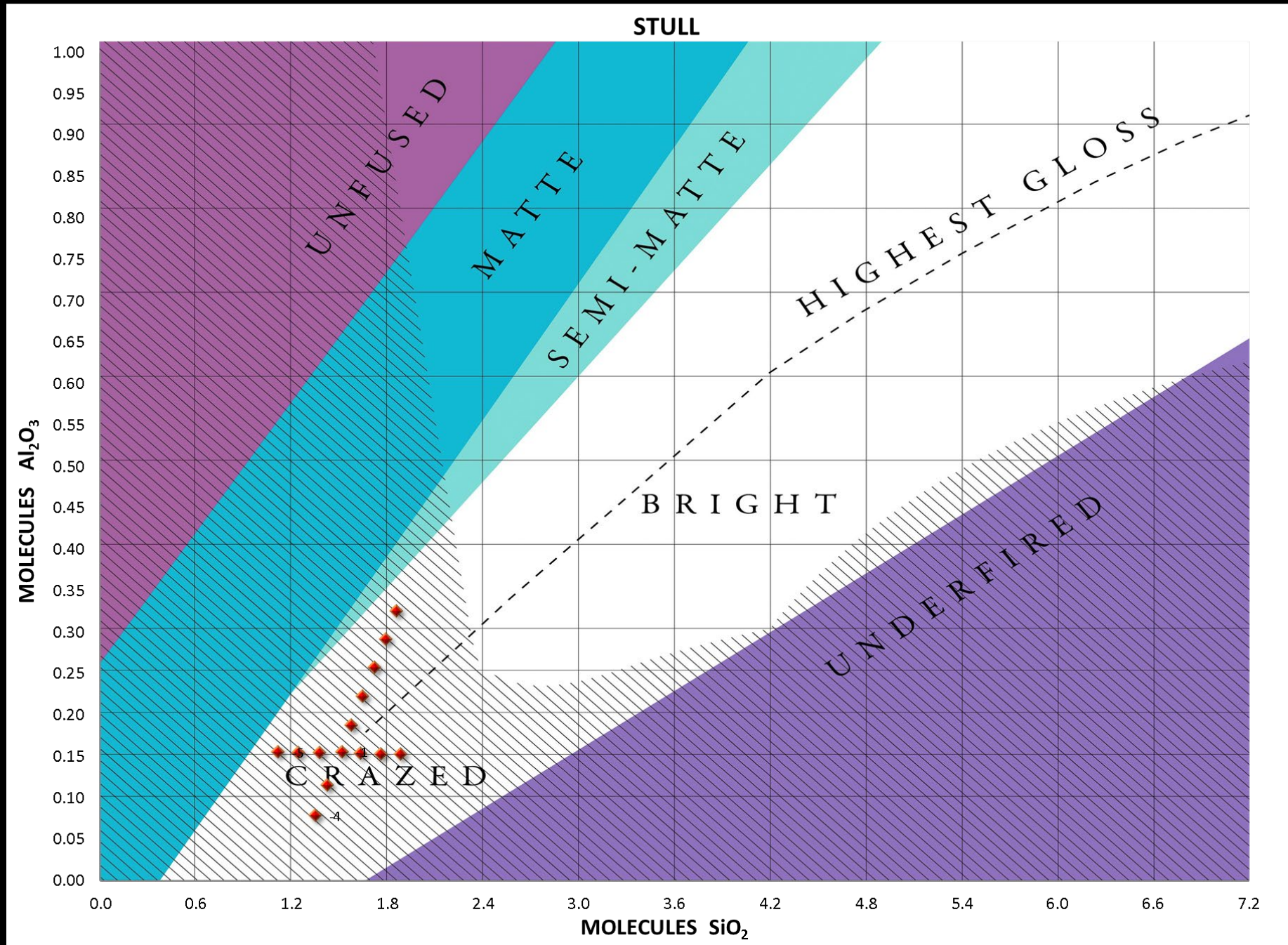


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# Big Red

Original

070822 -1

|              |       |
|--------------|-------|
| G200 EU      | 23.37 |
| Whiting      | 27.11 |
| EPK          | 11.17 |
| Flint        | 12.73 |
| 3134         | 25.62 |
| Chrome Oxide | 0.10  |
| Tin Oxide    | 8.00  |
| Water        | 60    |



1-3 Second Dip



2-3 Second Dips



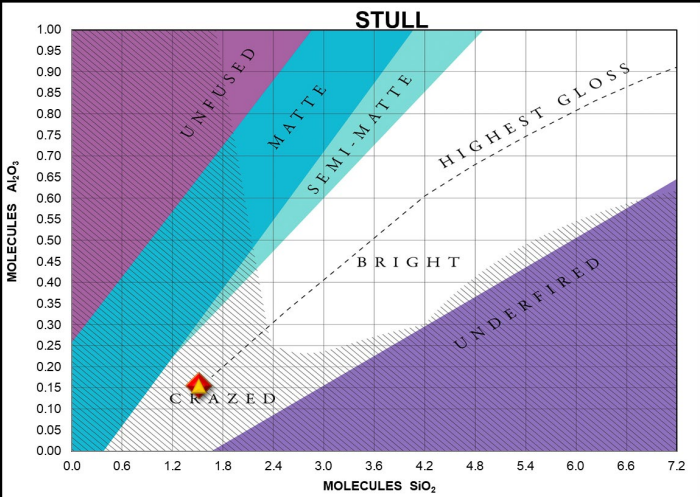
Reduction



Oxidation

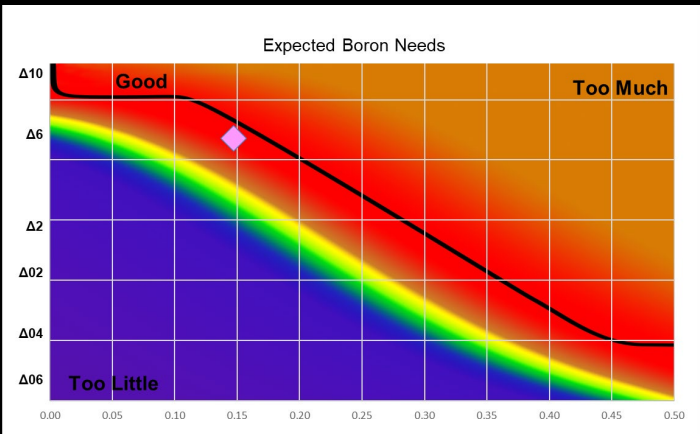
UMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>9.75 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.69                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.17 | Na <sub>2</sub> O<br>0.11      | K <sub>2</sub> O<br>0.06 | MgO<br>0.00             | CaO<br>0.82 |
| B <sub>2</sub> O <sub>3</sub><br>0.16                              | Al <sub>2</sub> O <sub>3</sub><br>0.17               | 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                     | 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         |



EUMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>9.75 : 1 |                                                      | Alkali Metals<br>0.26          |                          | Alkaline Earths<br>0.74 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.52                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.16 | Na <sub>2</sub> O<br>0.10      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.74 |
| B <sub>2</sub> O <sub>3</sub><br>0.15                              | Al <sub>2</sub> O <sub>3</sub><br>0.15               | 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>0.10 | ZnO                     | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.00                             | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



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# Big Red

w/o Kaolin

070822 -4

|              |       |
|--------------|-------|
| G200 EU      | 26.31 |
| Whiting      | 30.52 |
| EPK          |       |
| Flint        | 14.33 |
| 3134         | 28.84 |
| Chrome Oxide | 0.11  |
| Tin Oxide    | 8.71  |
| Water        | 60    |



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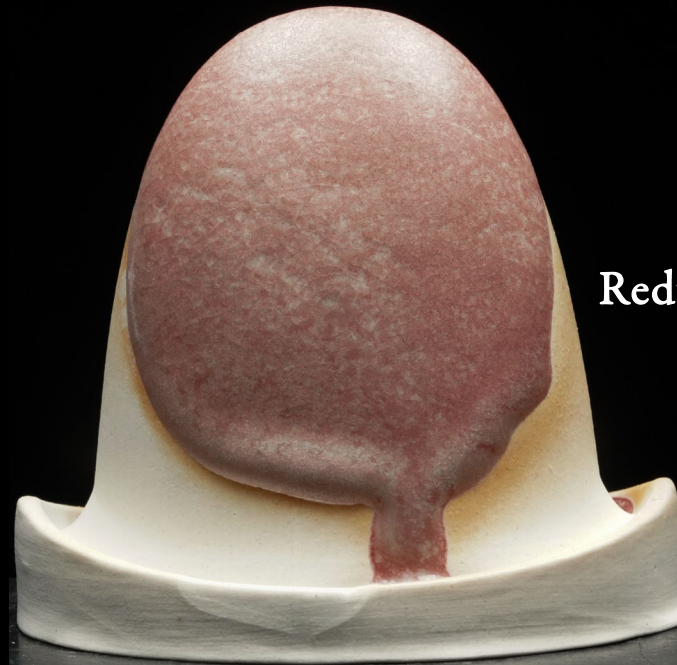


1-3 Second Dip

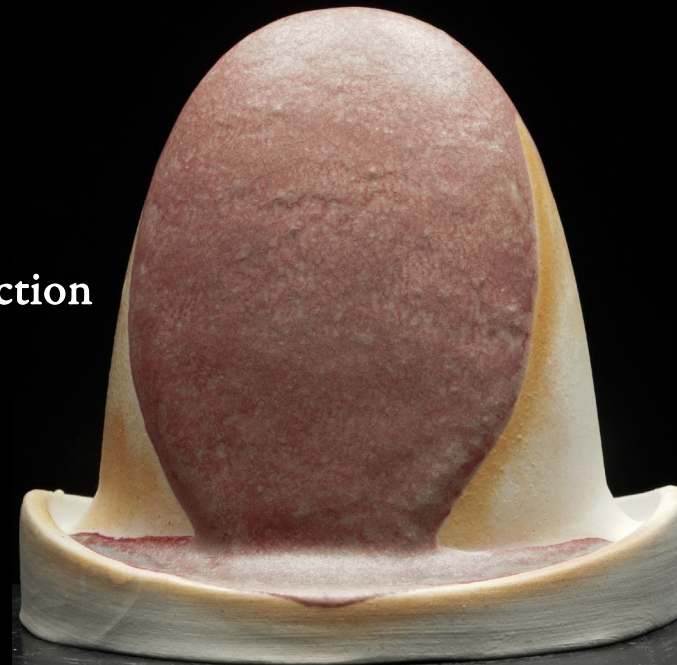


2-3 Second Dips

Oxidation



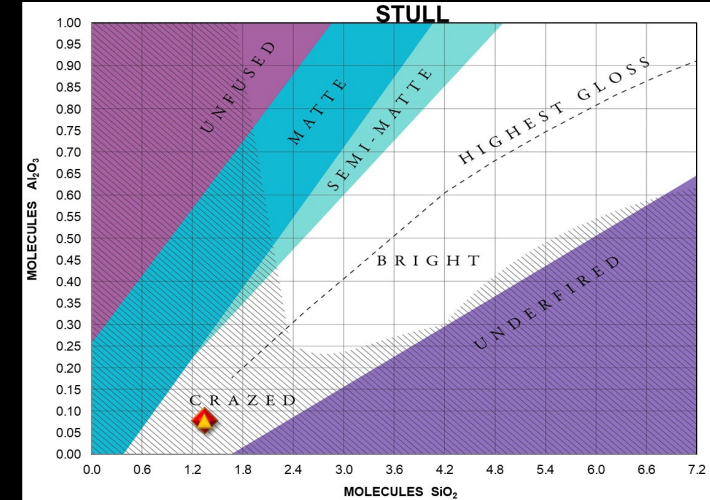
Reduction



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| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>17.11 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|---------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.50                                            | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.09 | Na <sub>2</sub> O<br>0.11      | K <sub>2</sub> O<br>0.06 | MgO<br>0.00             | CaO<br>0.83 |
| B <sub>2</sub> O <sub>3</sub><br>0.17                               | Al <sub>2</sub> O <sub>3</sub><br>0.09               | 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                     | 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         |



EUMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>17.11 : 1 |                                                      | Alkali Metals<br>0.26          |                          | Alkaline Earths<br>0.74 |             |
|---------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.35                                            | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.08 | Na <sub>2</sub> O<br>0.10      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.74 |
| B <sub>2</sub> O <sub>3</sub><br>0.15                               | Al <sub>2</sub> O <sub>3</sub><br>0.08               | 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>0.10 | ZnO                     | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.00                              | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



# Big Red

w/o Silica

070822 -5

|              |       |
|--------------|-------|
| G200 EU      | 26.78 |
| Whiting      | 31.07 |
| EPK          | 12.80 |
| Flint        |       |
| 3134         | 29.36 |
| Chrome Oxide | 0.11  |
| Tin Oxide    | 8.71  |
| Water        | 60    |



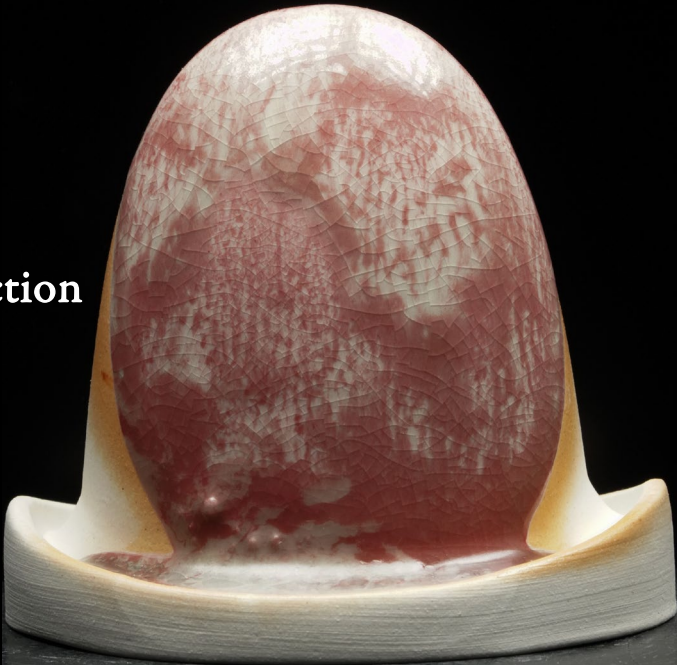
1-3 Second Dip



2-3 Second Dips



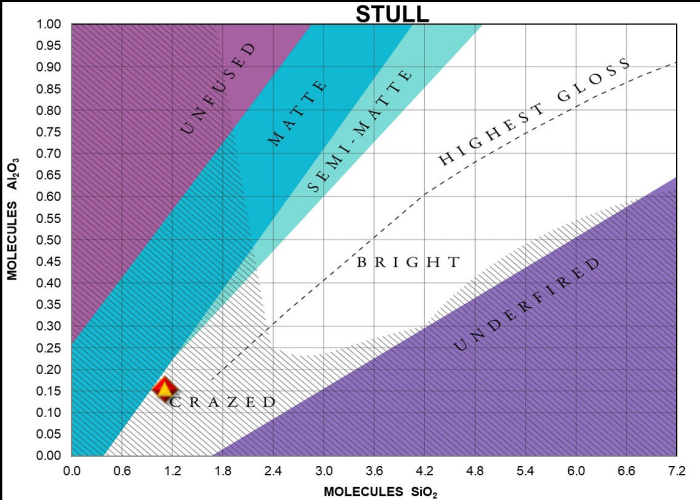
Reduction



Oxidation

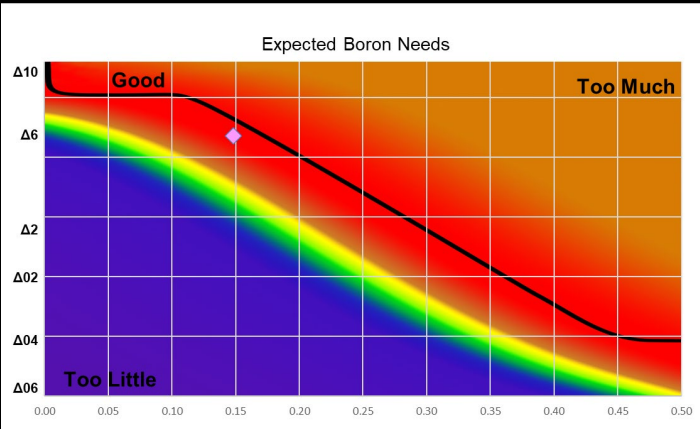
UMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.16 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.23                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.17 | Na <sub>2</sub> O<br>0.11      | K <sub>2</sub> O<br>0.06 | MgO<br>0.00             | CaO<br>0.82 |
| B <sub>2</sub> O <sub>3</sub><br>0.16                              | Al <sub>2</sub> O <sub>3</sub><br>0.17               | 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                     | 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         |



EUMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.16 : 1 |                                                      | Alkali Metals<br>0.25          |                          | Alkaline Earths<br>0.75 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.11                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.16 | Na <sub>2</sub> O<br>0.10      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.74 |
| B <sub>2</sub> O <sub>3</sub><br>0.15                              | Al <sub>2</sub> O <sub>3</sub><br>0.15               | 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>0.10 | ZnO                     | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.00                             | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



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# Big Red

Mapping  
Kaolin 2

070822-24

|              |       |
|--------------|-------|
| G200 EU      | 24.79 |
| Whiting      | 28.76 |
| EPK          | 5.77  |
| Flint        | 13.51 |
| 3134         | 27.17 |
| Chrome Oxide | 0.11  |
| Tin Oxide    | 8.70  |
| Water        | 65    |



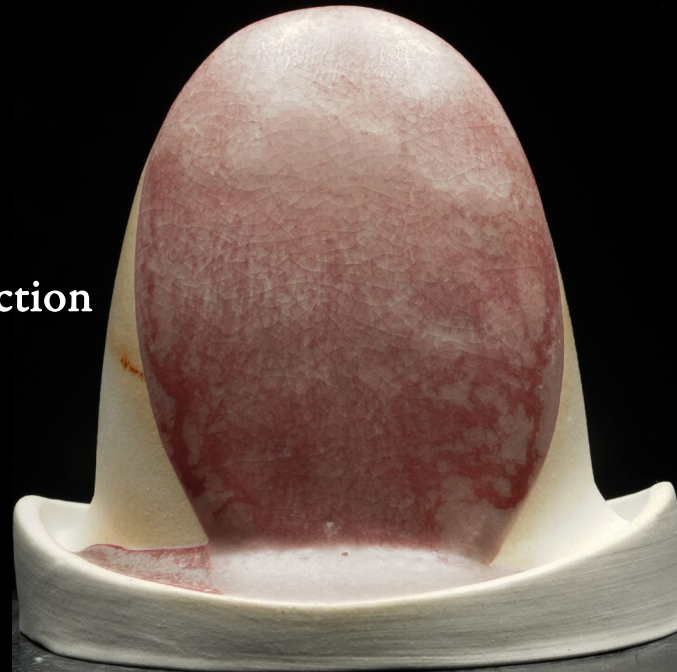
1-3 Second Dip



2-3 Second Dips



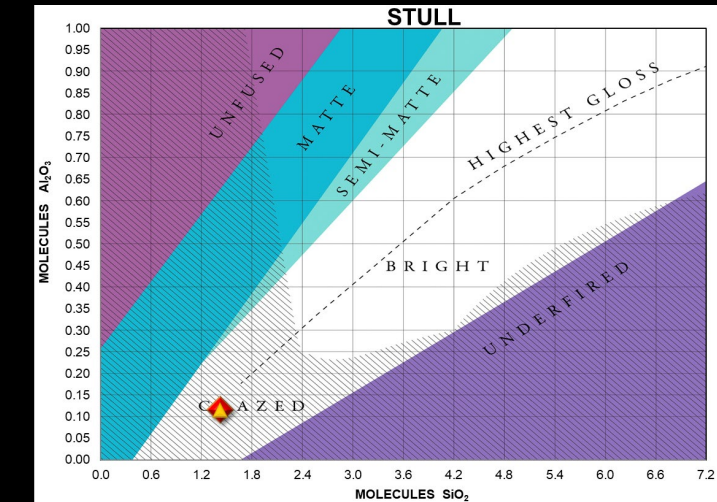
Reduction



Oxidation

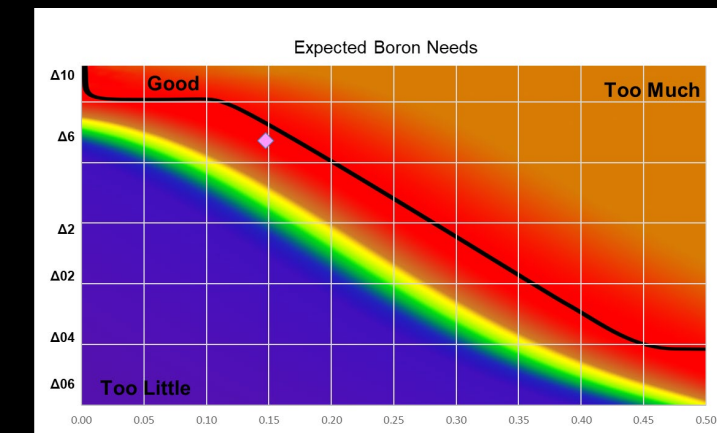
UMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>12.29 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|---------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.59                                            | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.13 | Na <sub>2</sub> O<br>0.11      | K <sub>2</sub> O<br>0.06 | MgO<br>0.00             | CaO<br>0.82 |
| B <sub>2</sub> O <sub>3</sub><br>0.16                               | Al <sub>2</sub> O <sub>3</sub><br>0.13               | 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                     | 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         |



EUMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>12.29 : 1 |                                                      | Alkali Metals<br>0.26          |                          | Alkaline Earths<br>0.74 |             |
|---------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.42                                            | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.12 | Na <sub>2</sub> O<br>0.10      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.73 |
| B <sub>2</sub> O <sub>3</sub><br>0.15                               | Al <sub>2</sub> O <sub>3</sub><br>0.11               | 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>0.11 | ZnO                     | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.00                              | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



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# Big Red

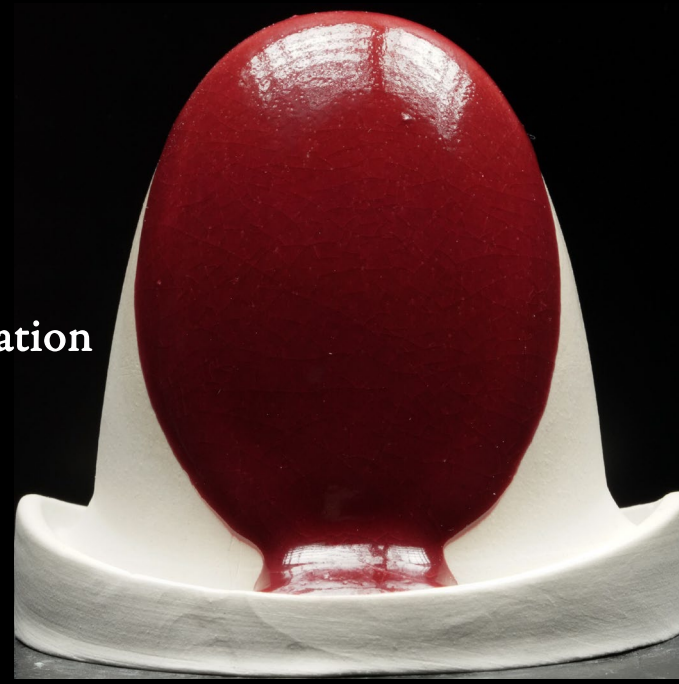
Mapping  
Kaolin 4

070822-25

|              |       |
|--------------|-------|
| G200 EU      | 20.42 |
| Whiting      | 23.70 |
| EPK          | 14.27 |
| Flint        | 11.13 |
| 3134         | 22.39 |
| Chrome Oxide | 0.10  |
| Tin Oxide    | 8.00  |
| Water        | 70    |



1-3 Second Dip



2-3 Second Dips

Oxidation



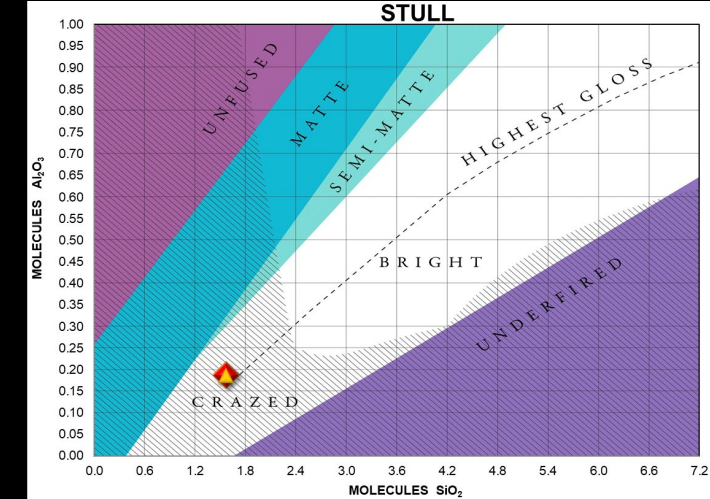
Reduction



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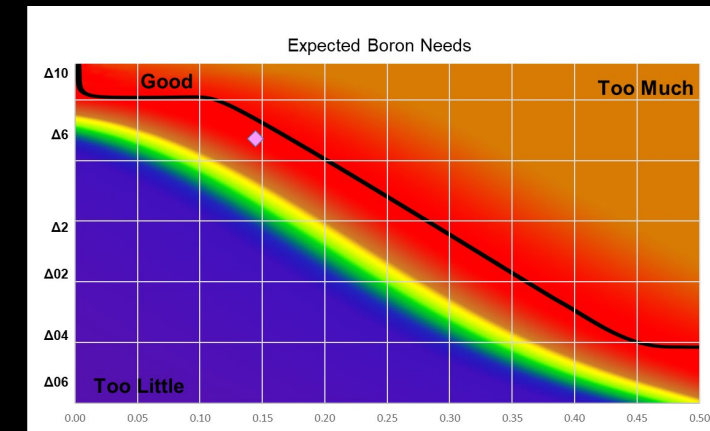
UMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>8.36 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.78                                           | 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>0.06 | MgO<br>0.00             | CaO<br>0.82 |
| B <sub>2</sub> O <sub>3</sub><br>0.16                              | 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                     | 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>8.36 : 1 |                                                      | Alkali Metals<br>0.27          |                          | Alkaline Earths<br>0.73 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.57                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.19 | Na <sub>2</sub> O<br>0.10      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.72 |
| B <sub>2</sub> O <sub>3</sub><br>0.14                              | Al <sub>2</sub> O <sub>3</sub><br>0.19               | 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>0.12 | ZnO                     | FeO<br>0.01 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.00                             | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



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# Big Red

Mapping  
Kaolin 5

070822-26

|              |       |
|--------------|-------|
| G200 EU      | 21.13 |
| Whiting      | 24.52 |
| EPK          | 19.68 |
| Flint        | 11.51 |
| 3134         | 23.16 |
| Chrome Oxide | 0.11  |
| Tin Oxide    | 8.70  |
| Water        | 70    |



Ceramic  
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Workshop



1-3 Second Dip

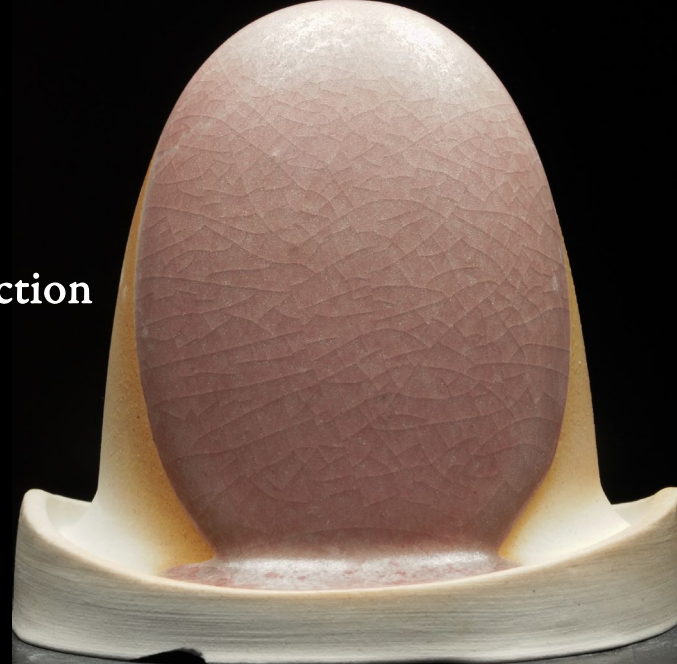


2-3 Second Dips

Oxidation



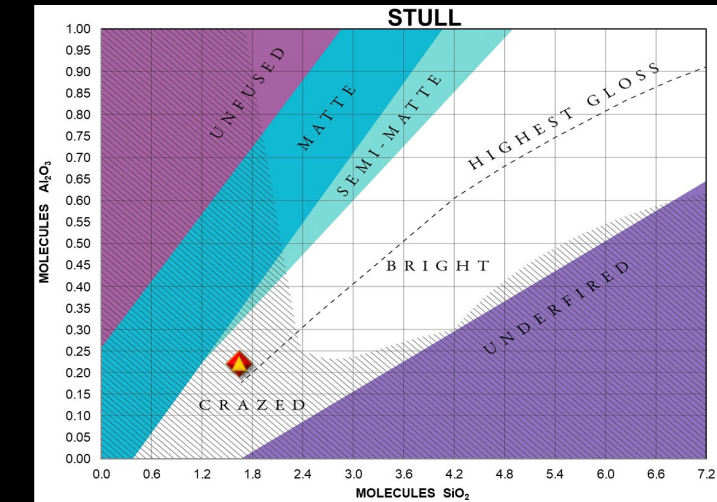
Reduction



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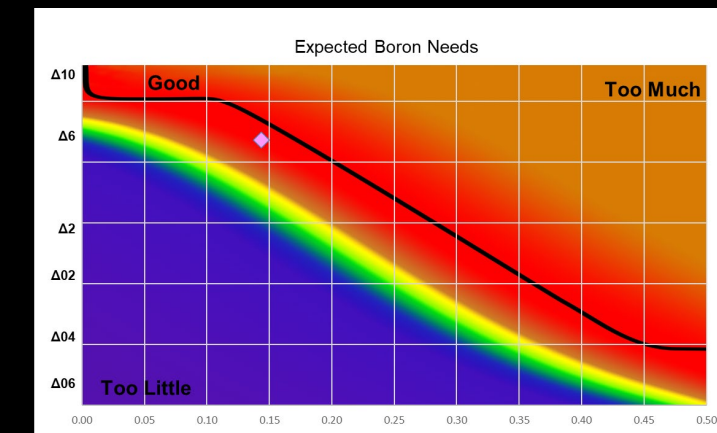
UMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>7.37 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.87                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.25 | Na <sub>2</sub> O<br>0.11      | K <sub>2</sub> O<br>0.06 | MgO<br>0.00             | CaO<br>0.82 |
| B <sub>2</sub> O <sub>3</sub><br>0.16                              | Al <sub>2</sub> O <sub>3</sub><br>0.25               | 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                     | 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>7.37 : 1 |                                                      | Alkali Metals<br>0.27          |                          | Alkaline Earths<br>0.73 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.64                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.22 | Na <sub>2</sub> O<br>0.10      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.72 |
| B <sub>2</sub> O <sub>3</sub><br>0.14                              | Al <sub>2</sub> O <sub>3</sub><br>0.22               | 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>0.12 | ZnO                     | FeO<br>0.01 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.00                             | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



# Big Red

Mapping  
Kaolin 6

070822-27

|              |       |
|--------------|-------|
| G200 EU      | 20.14 |
| Whiting      | 23.37 |
| EPK          | 23.44 |
| Flint        | 10.97 |
| 3134         | 22.08 |
| Chrome Oxide | 0.11  |
| Tin Oxide    | 8.70  |
| Water        | 70    |



1-3 Second Dip



2-3 Second Dips



Reduction



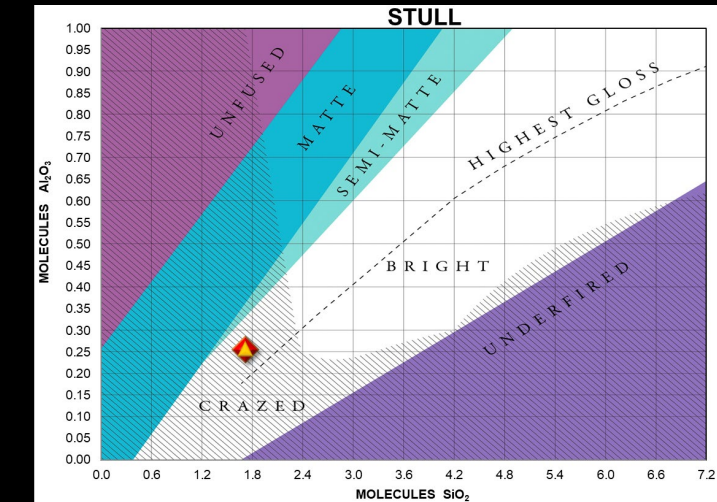
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Oxidation

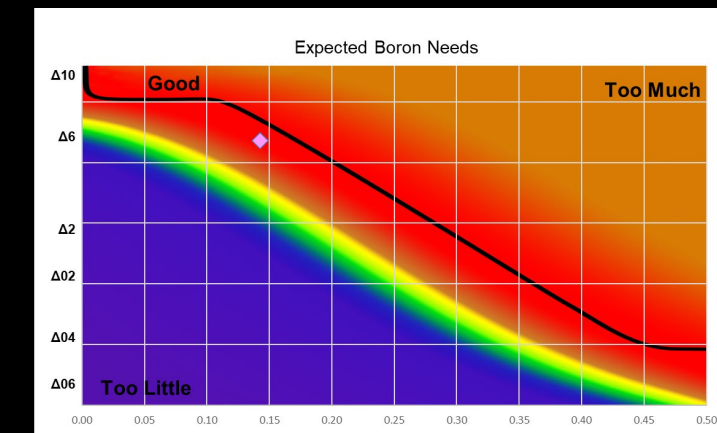
UMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>6.66 :1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|-------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.97                                          | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.30 | Na <sub>2</sub> O<br>0.11      | K <sub>2</sub> O<br>0.06 | MgO<br>0.00             | CaO<br>0.81 |
| B <sub>2</sub> O <sub>3</sub><br>0.16                             | 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                     | 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>6.66 :1 |                                                      | Alkali Metals<br>0.28          |                          | Alkaline Earths<br>0.72 |             |
|-------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.72                                          | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.26 | Na <sub>2</sub> O<br>0.10      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.71 |
| B <sub>2</sub> O <sub>3</sub><br>0.14                             | Al <sub>2</sub> O <sub>3</sub><br>0.26               | 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>0.13 | ZnO                     | FeO<br>0.01 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.00                            | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |

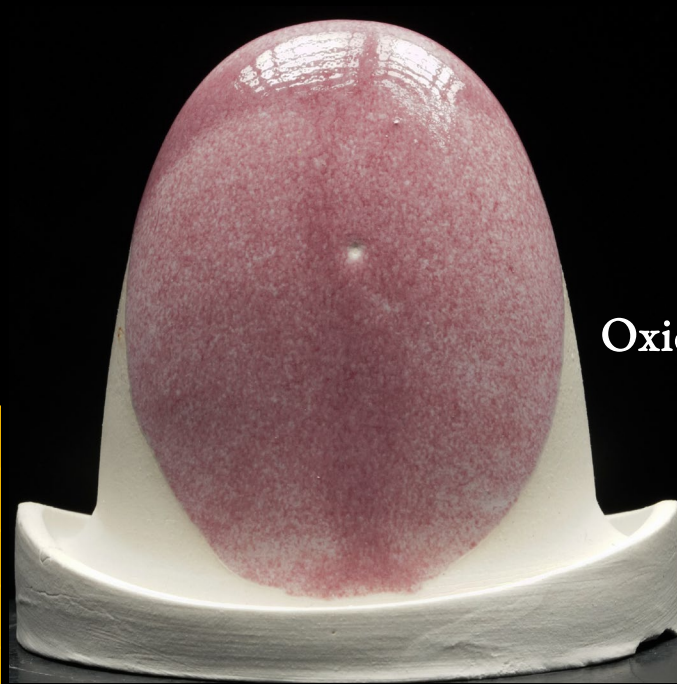


# Big Red

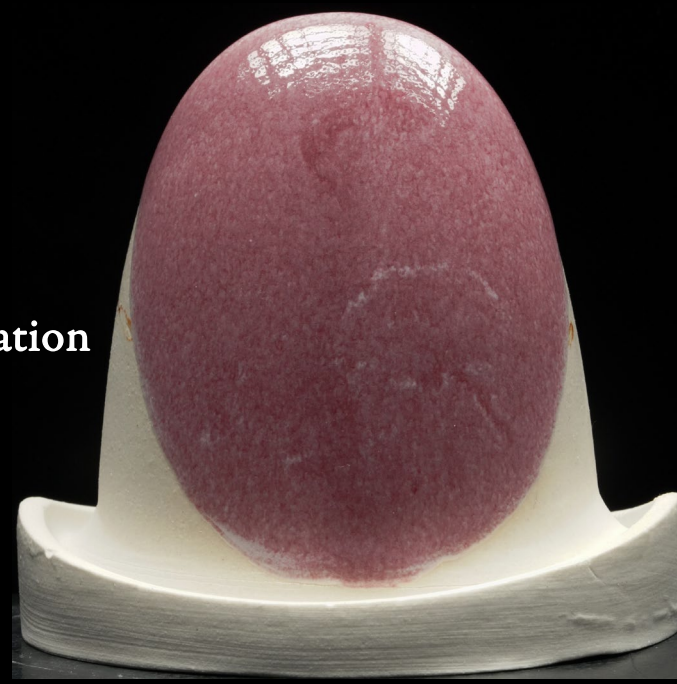
Mapping  
Kaolin 7

070822-28

|              |       |
|--------------|-------|
| G200 EU      | 19.24 |
| Whiting      | 22.32 |
| EPK          | 26.87 |
| Flint        | 10.48 |
| 3134         | 21.09 |
| Chrome Oxide | 0.11  |
| Tin Oxide    | 8.70  |
| Water        | 80    |



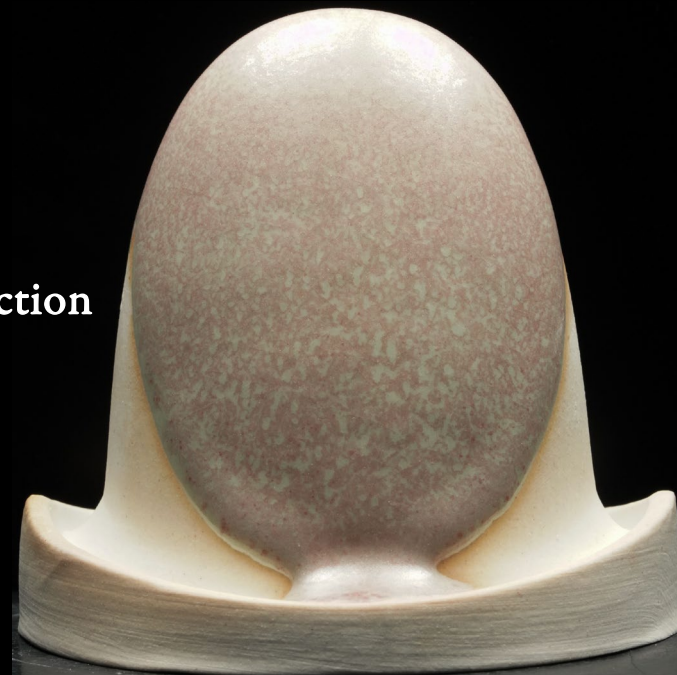
1-3 Second Dip



2-3 Second Dips



Reduction



Oxidation

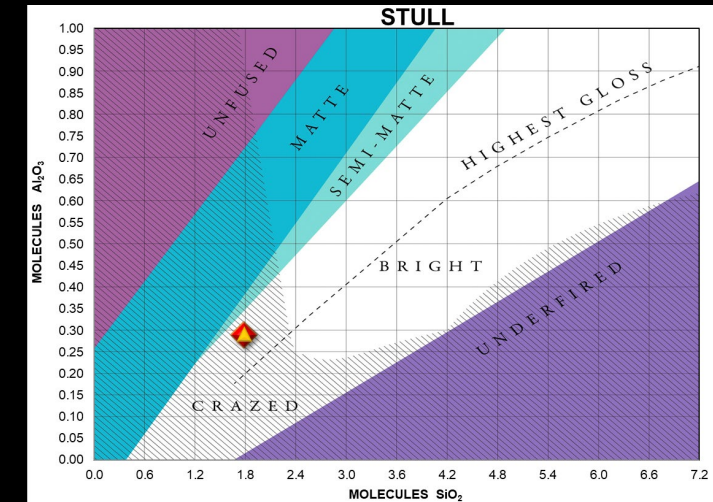


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UMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>6.12 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.06                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.34 | Na <sub>2</sub> O<br>0.11      | K <sub>2</sub> O<br>0.06 | MgO<br>0.00             | CaO<br>0.81 |
| B <sub>2</sub> O <sub>3</sub><br>0.16                              | Al <sub>2</sub> O <sub>3</sub><br>0.33               | 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                     | 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         |



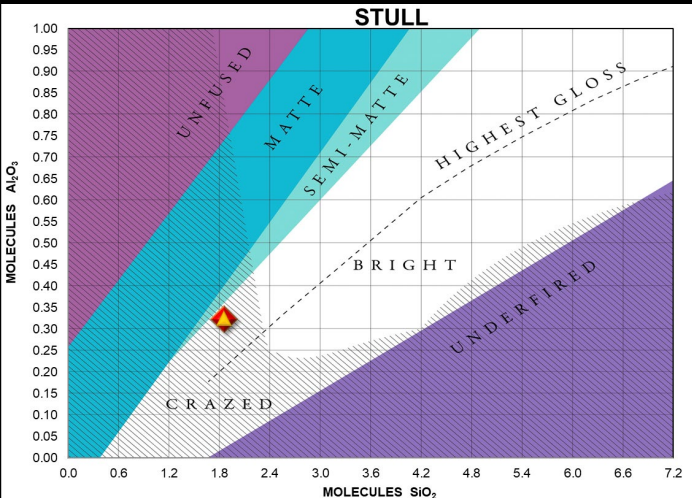
EUMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>6.12 : 1 |                                                      | Alkali Metals<br>0.28          |                          | Alkaline Earths<br>0.72 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.79                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.29 | Na <sub>2</sub> O<br>0.10      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.71 |
| B <sub>2</sub> O <sub>3</sub><br>0.14                              | 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>0.13 | ZnO                     | FeO<br>0.01 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.00                             | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



UMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>5.70 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.15                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.38 | Na <sub>2</sub> O<br>0.11      | K <sub>2</sub> O<br>0.06 | MgO<br>0.00             | CaO<br>0.81 |
| B <sub>2</sub> O <sub>3</sub><br>0.16                              | Al <sub>2</sub> O <sub>3</sub><br>0.37               | 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                     | 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

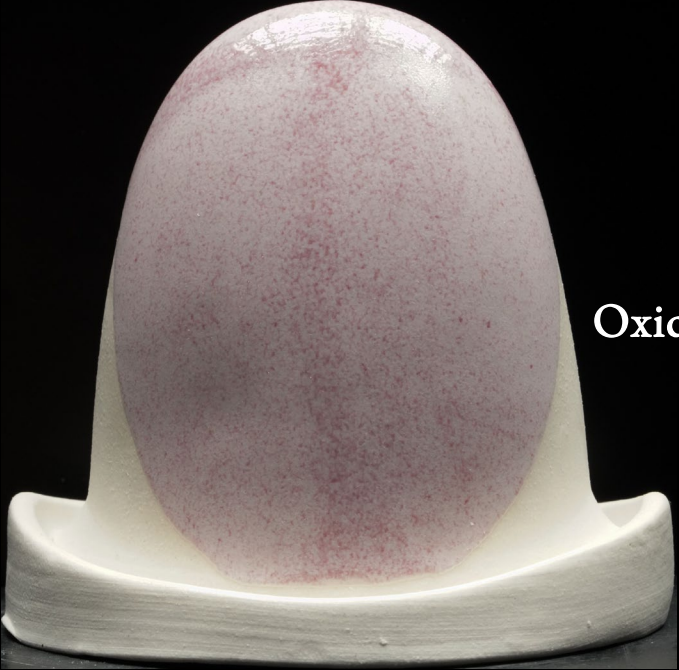
| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>5.70 : 1 |                                                      | Alkali Metals<br>0.29          |                          | Alkaline Earths<br>0.71 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.86                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.33 | Na <sub>2</sub> O<br>0.09      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.70 |
| B <sub>2</sub> O <sub>3</sub><br>0.14                              | 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><br>0.14 | ZnO                     | FeO<br>0.01 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.00                             | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



# Big Red

Mapping  
Kaolin 8  
070822-29

|              |       |
|--------------|-------|
| G200 EU      | 18.41 |
| Whiting      | 21.36 |
| EPK          | 30.01 |
| Flint        | 10.03 |
| 3134         | 20.18 |
| Chrome Oxide | 0.11  |
| Tin Oxide    | 8.70  |
| Water        | 80    |



1-3 Second Dip



2-3 Second Dips



Reduction

# Big Red

Mapping  
Silica 2

070822-30

|              |       |
|--------------|-------|
| G200 EU      | 25.54 |
| Whiting      | 29.63 |
| EPK          | 12.20 |
| Flint        | 4.64  |
| 3134         | 27.99 |
| Chrome Oxide | 0.11  |
| Tin Oxide    | 8.70  |
| Water        | 60    |



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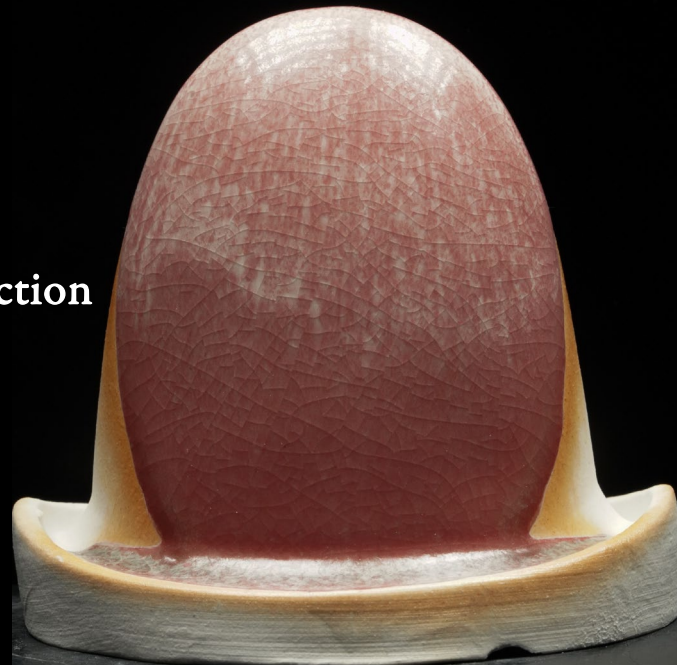
1-3 Second Dip



2-3 Second Dips



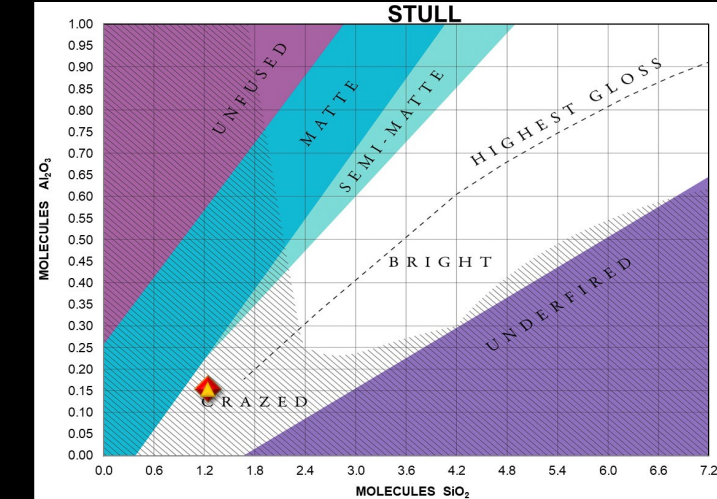
Reduction



Oxidation

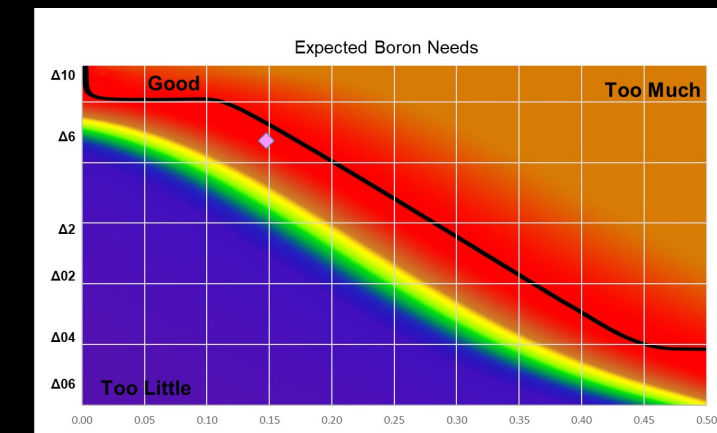
UMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>8.03 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.39                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.17 | Na <sub>2</sub> O<br>0.11      | K <sub>2</sub> O<br>0.06 | MgO<br>0.00             | CaO<br>0.82 |
| B <sub>2</sub> O <sub>3</sub><br>0.16                              | Al <sub>2</sub> O <sub>3</sub><br>0.17               | 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                     | 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         |



EUMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>8.03 : 1 |                                                      | Alkali Metals<br>0.26          |                          | Alkaline Earths<br>0.74 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.24                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.15 | Na <sub>2</sub> O<br>0.10      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.74 |
| B <sub>2</sub> O <sub>3</sub><br>0.15                              | Al <sub>2</sub> O <sub>3</sub><br>0.15               | 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>0.10 | ZnO                     | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.00                             | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



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# Big Red

Mapping  
Silica 3

070822-31

|              |       |
|--------------|-------|
| G200 EU      | 24.40 |
| Whiting      | 28.31 |
| EPK          | 11.66 |
| Flint        | 8.86  |
| 3134         | 26.75 |
| Chrome Oxide | 0.11  |
| Tin Oxide    | 8.70  |
| Water        | 60    |



1-3 Second Dip

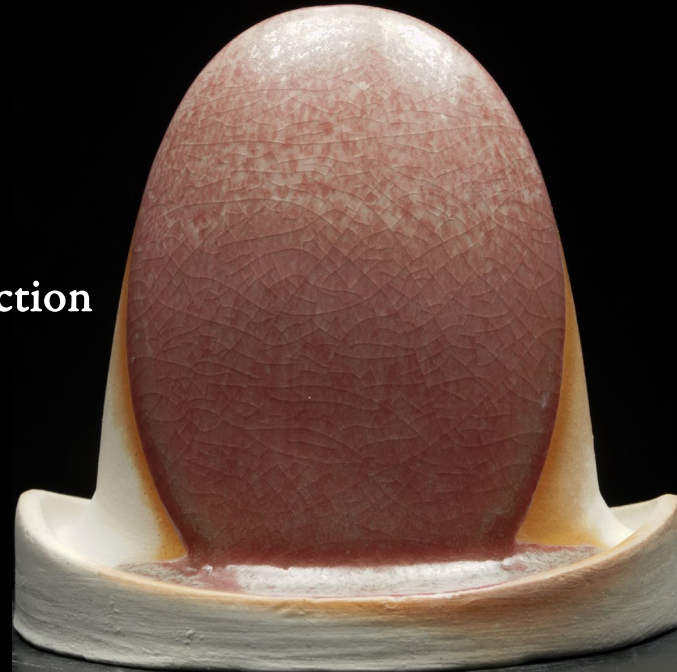


2-3 Second Dips

Oxidation



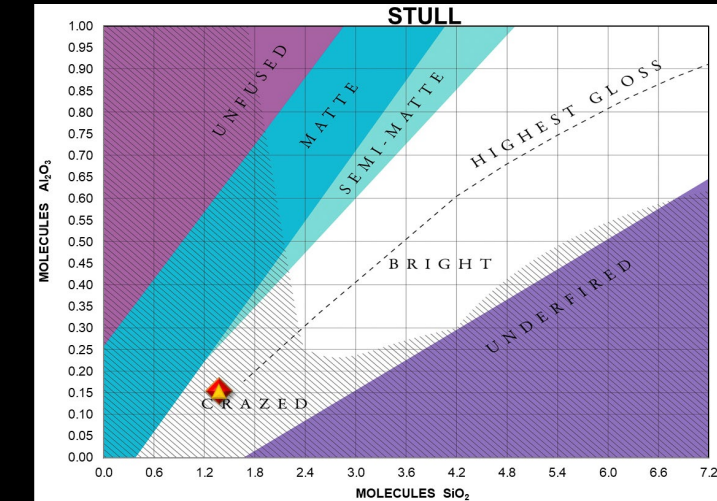
Reduction



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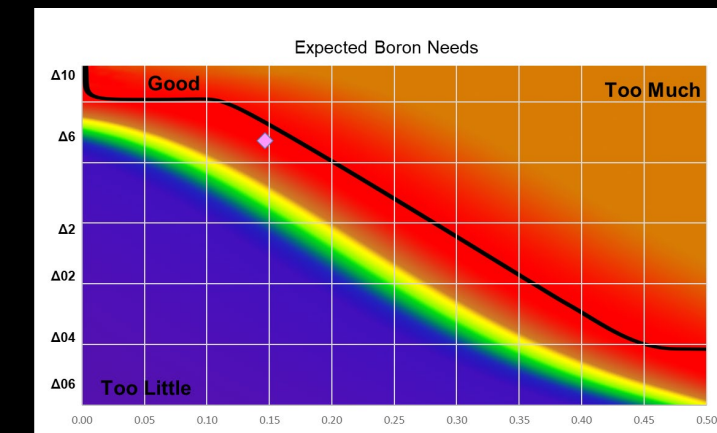
UMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>8.89 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.54                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.17 | Na <sub>2</sub> O<br>0.11      | K <sub>2</sub> O<br>0.06 | MgO<br>0.00             | CaO<br>0.82 |
| B <sub>2</sub> O <sub>3</sub><br>0.16                              | Al <sub>2</sub> O <sub>3</sub><br>0.17               | 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                     | 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         |



EUMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>8.89 : 1 |                                                      | Alkali Metals<br>0.26          |                          | Alkaline Earths<br>0.74 |             |
|--------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.37                                           | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.15 | Na <sub>2</sub> O<br>0.10      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.73 |
| B <sub>2</sub> O <sub>3</sub><br>0.15                              | Al <sub>2</sub> O <sub>3</sub><br>0.15               | 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>0.11 | ZnO                     | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.00                             | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



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# Big Red

Mapping  
Silica 5

070822-32

|              |       |
|--------------|-------|
| G200 EU      | 22.42 |
| Whiting      | 26.01 |
| EPK          | 10.71 |
| Flint        | 16.28 |
| 3134         | 24.57 |
| Chrome Oxide | 0.11  |
| Tin Oxide    | 8.70  |
| Water        | 65    |



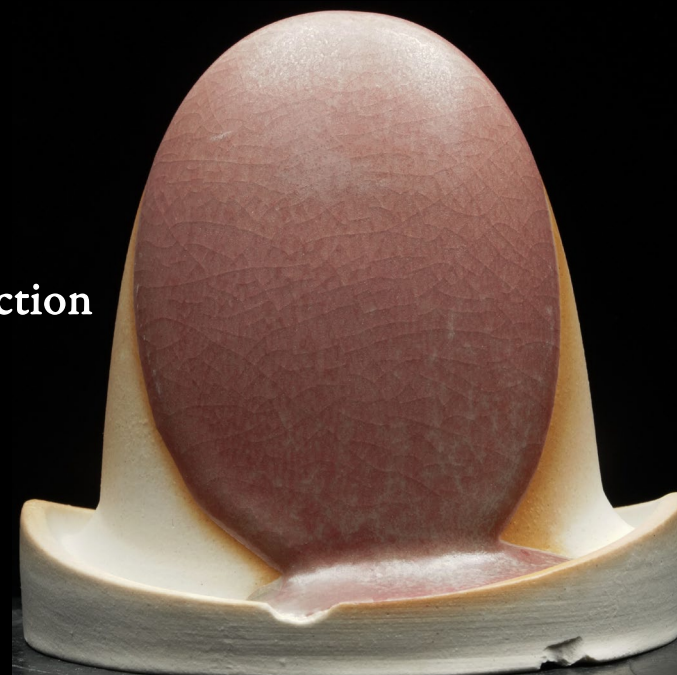
1-3 Second Dip



2-3 Second Dips



Reduction



Oxidation

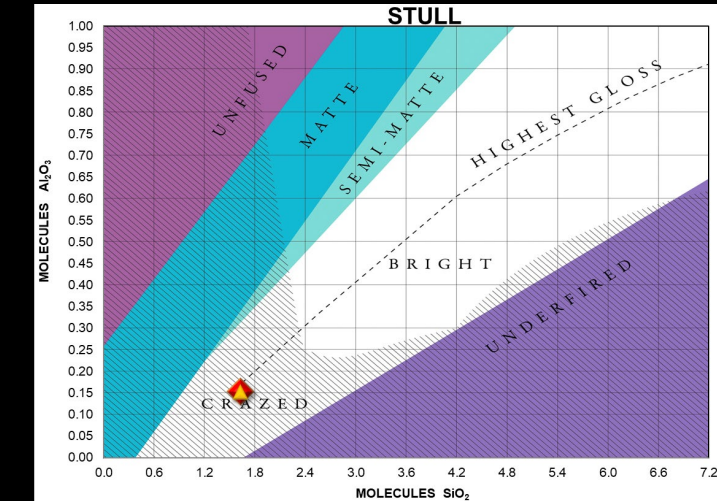


Ceramic  
Materials  
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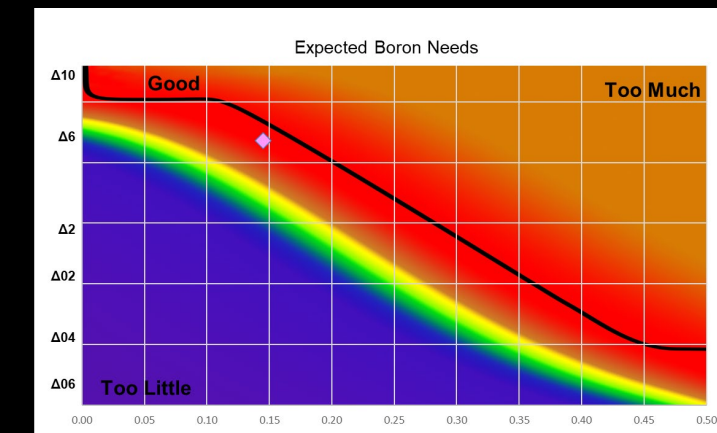
UMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>10.60 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|---------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.84                                            | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.17 | Na <sub>2</sub> O<br>0.11      | K <sub>2</sub> O<br>0.06 | MgO<br>0.00             | CaO<br>0.82 |
| B <sub>2</sub> O <sub>3</sub><br>0.16                               | Al <sub>2</sub> O <sub>3</sub><br>0.17               | 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                     | 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         |



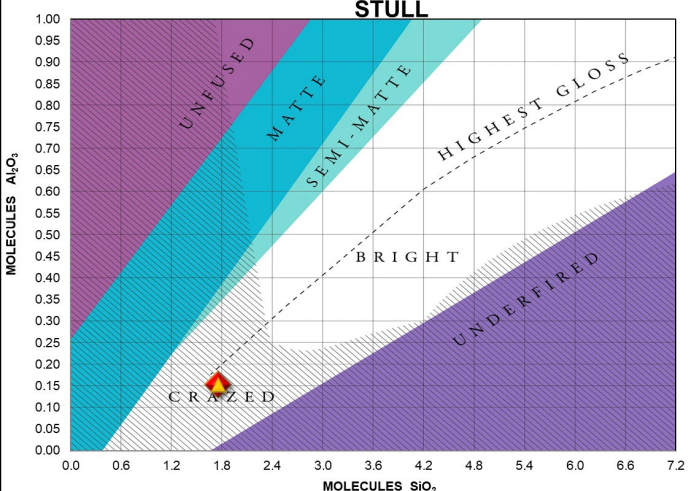
EUMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>10.60 : 1 |                                                      | Alkali Metals<br>0.27          |                          | Alkaline Earths<br>0.73 |             |
|---------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.63                                            | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.15 | Na <sub>2</sub> O<br>0.10      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.72 |
| B <sub>2</sub> O <sub>3</sub><br>0.15                               | Al <sub>2</sub> O <sub>3</sub><br>0.15               | 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>0.12 | ZnO                     | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.00                              | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



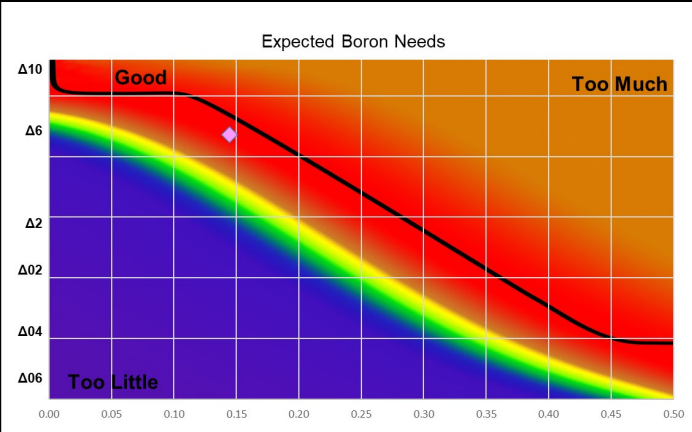
UMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>11.45 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|---------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.00                                            | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.17 | Na <sub>2</sub> O<br>0.11      | K <sub>2</sub> O<br>0.06 | MgO<br>0.00             | CaO<br>0.82 |
| B <sub>2</sub> O <sub>3</sub><br>0.16                               | Al <sub>2</sub> O <sub>3</sub><br>0.17               | 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                     | 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>11.45 : 1 |                                                      | Alkali Metals<br>0.27          |                          | Alkaline Earths<br>0.73 |             |
|---------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.76                                            | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.15 | Na <sub>2</sub> O<br>0.10      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.72 |
| B <sub>2</sub> O <sub>3</sub><br>0.14                               | Al <sub>2</sub> O <sub>3</sub><br>0.15               | 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>0.12 | ZnO                     | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.00                              | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |



# Big Red

Mapping  
Silica 6

070822-33

|              |       |
|--------------|-------|
| G200 EU      | 21.54 |
| Whiting      | 24.99 |
| EPK          | 10.29 |
| Flint        | 19.56 |
| 3134         | 23.61 |
| Chrome Oxide | 0.11  |
| Tin Oxide    | 8.70  |
| Water        | 65    |



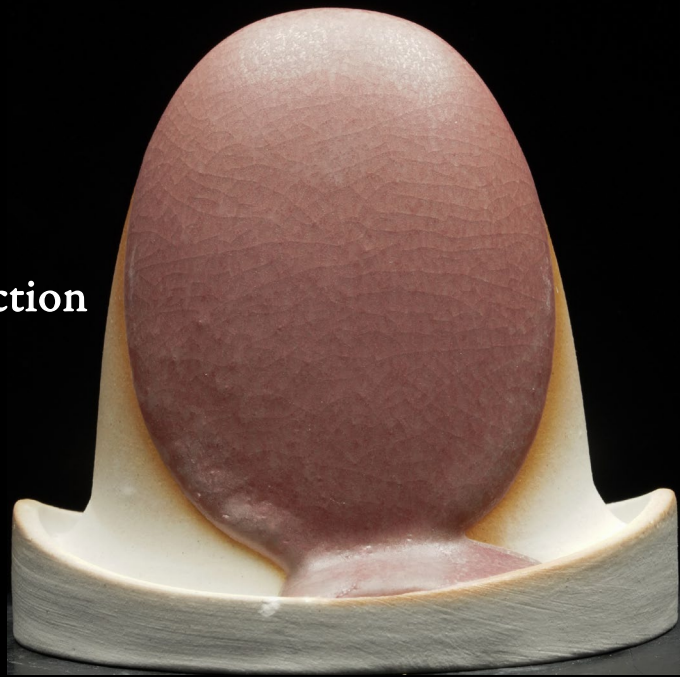
1-3 Second Dip



2-3 Second Dips



Reduction



# Big Red

Mapping  
Silica-7

070822-34

|              |       |
|--------------|-------|
| G200 EU      | 20.73 |
| Whiting      | 24.05 |
| EPK          | 9.91  |
| Flint        | 22.59 |
| 3134         | 22.72 |
| Chrome Oxide | 0.11  |
| Tin Oxide    | 8.70  |
| Water        | 65    |



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1-3 Second Dip



2-3 Second Dips



Reduction

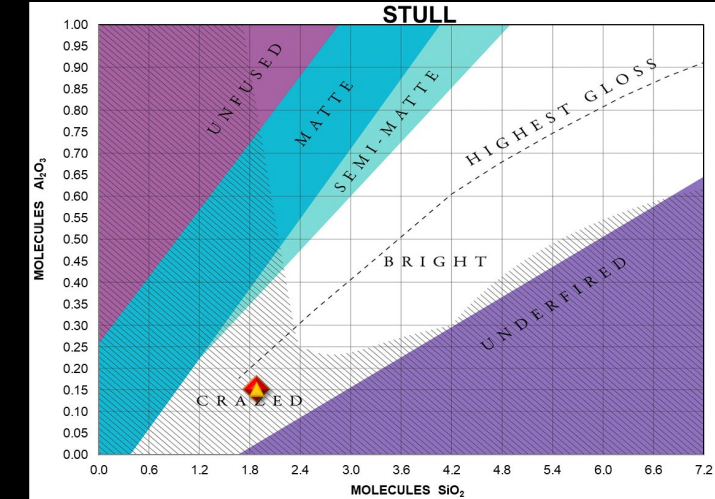


Oxidation

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UMF

| SiO <sub>2</sub> :Al <sub>2</sub> O <sub>3</sub> Ratio<br>12.29 : 1 |                                                      | Alkali Metals<br>0.17          |                          | Alkaline Earths<br>0.83 |             |
|---------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>2.15                                            | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.17 | Na <sub>2</sub> O<br>0.11      | K <sub>2</sub> O<br>0.06 | MgO<br>0.00             | CaO<br>0.82 |
| B <sub>2</sub> O <sub>3</sub><br>0.16                               | Al <sub>2</sub> O <sub>3</sub><br>0.17               | 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                     | 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>12.29 : 1 |                                                      | Alkali Metals<br>0.28          |                          | Alkaline Earths<br>0.72 |             |
|---------------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------|-------------------------|-------------|
| SiO <sub>2</sub><br>1.88                                            | Collective "Al <sub>2</sub> O <sub>3</sub> "<br>0.15 | Na <sub>2</sub> O<br>0.10      | K <sub>2</sub> O<br>0.05 | MgO<br>0.00             | CaO<br>0.72 |
| B <sub>2</sub> O <sub>3</sub><br>0.14                               | Al <sub>2</sub> O <sub>3</sub><br>0.15               | 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>0.13 | ZnO                     | FeO<br>0.00 |
| Cr <sub>2</sub> O <sub>3</sub><br>0.00                              | ZrO <sub>2</sub>                                     | P <sub>2</sub> O <sub>5</sub>  |                          | MnO <sub>2</sub>        | CoO         |

