

Heart of Glass- $\Delta 6$

Lab 2-Flux Capacity

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

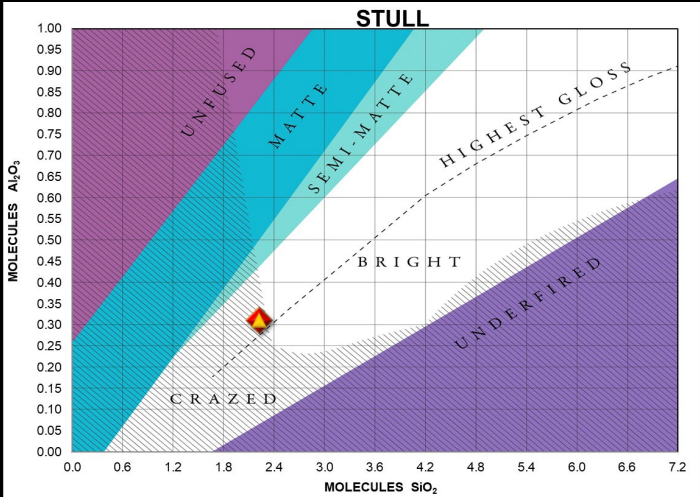


Reduction



UMF

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



EUMF

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



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Lab 2-Alkali Metals-Oxidation



070922-1



070922-8



070922-9



070922-10



070922-11



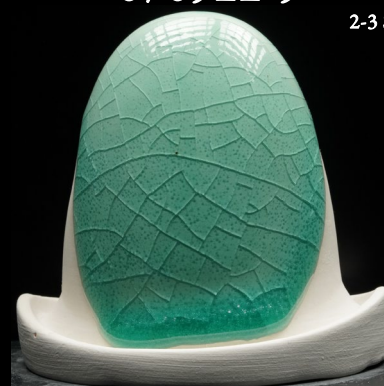
070922-12



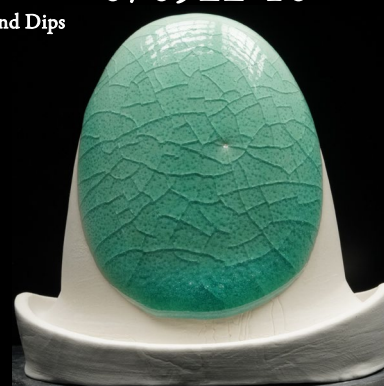
Original (NS)



w/Custer



w/Mahavir



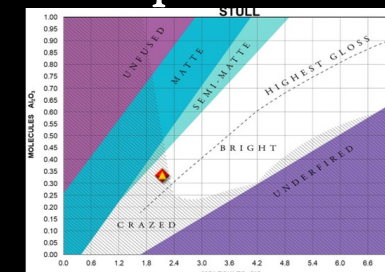
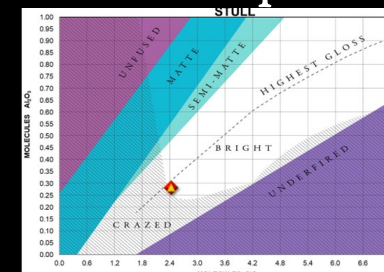
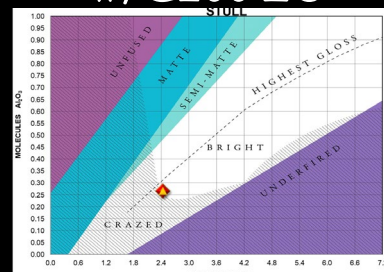
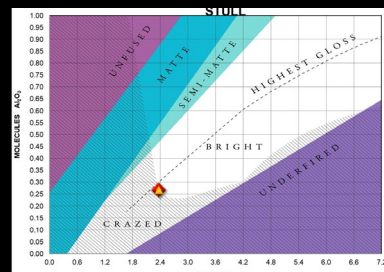
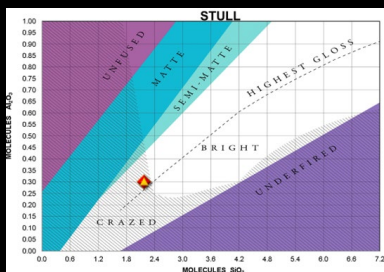
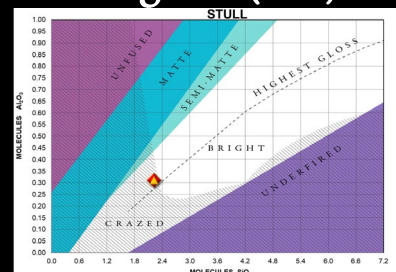
w/G200 EU



w/Minspar



w/Spodumene



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Lab 2-Alkali Metals-Oxidation



070922-1



070922-14



070922-15

1-3 Second Dip



Original

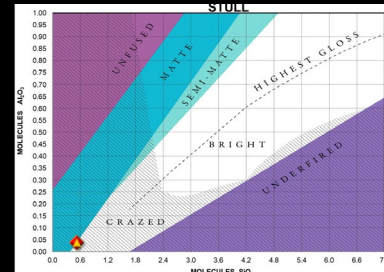
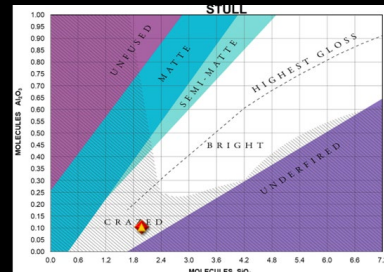
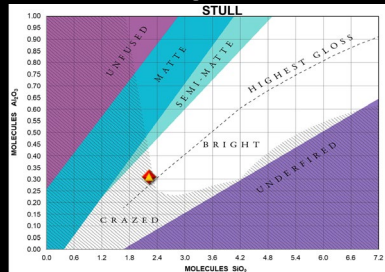


w/Frit 3110



w/Lithium Carbonate

2-3 Second Dips



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Lab 2-Alkali Metals-Reduction



070922-1



070922-8



070922-9



070922-10



070922-11



070922-12

1-3 Second Dip

2-3 Second Dips



Original (NS)



w/Custer



w/Mahavir



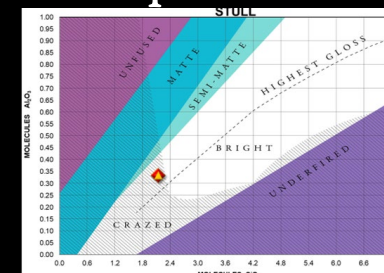
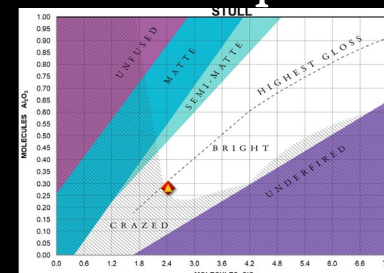
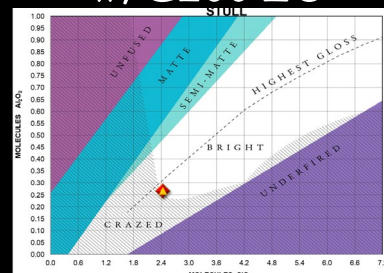
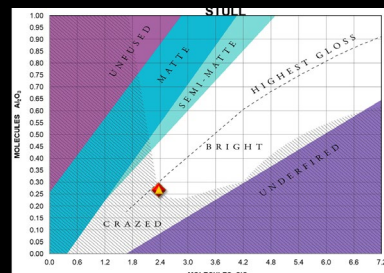
w/G200 EU



w/Minspar



w/Spodumene



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Lab 2-Alkali Metals-Reduction



070922-1



070922-14



070922-15

1-3 Second Dip

2-3 Second Dips



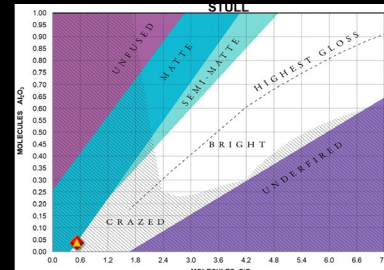
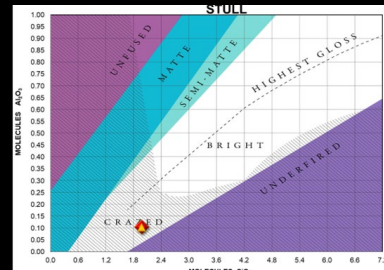
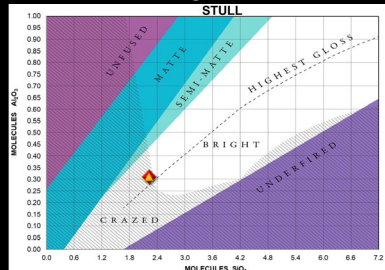
Original



w/Frit 3110



w/Lithium Carbonate



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Lab 2-Alkaline Earth-Oxidation



070922-1



070922-16



070922-17



070922-18



070922-19



070922-20



Original (W)



w/Talc



w/Mag Carb



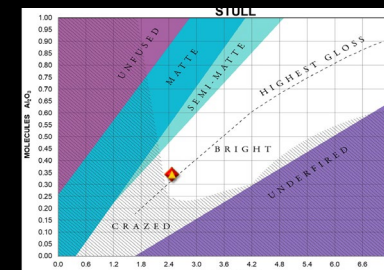
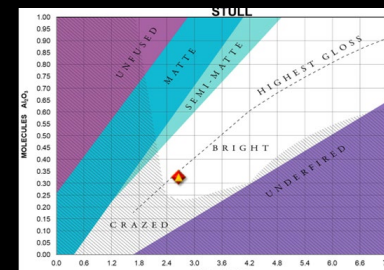
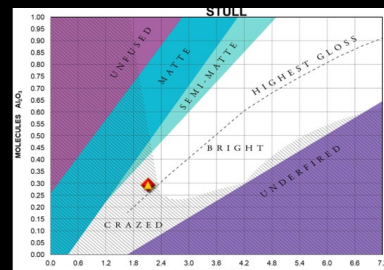
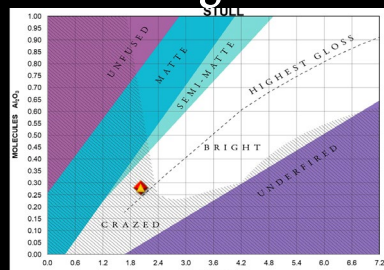
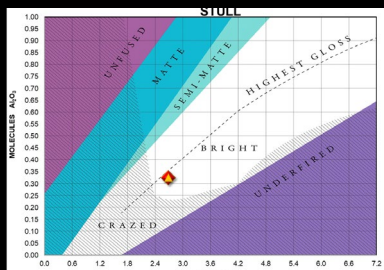
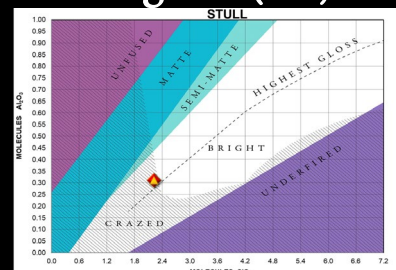
w/Dolomite



w/Wollastonite



w/Strontium Carb



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Lab 2-Alkaline Earth-Oxidation



070922-1



070922-21



070922-22



070922-23

1-3 Second Dip



Original (W)



w/Barium Carb

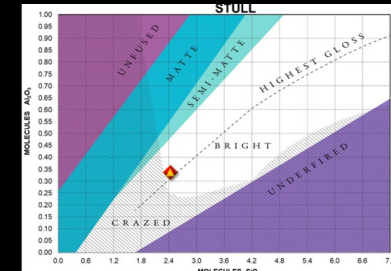
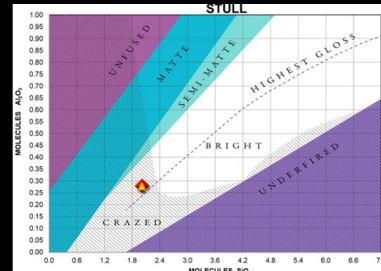
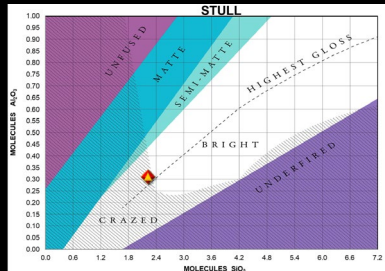


w/Zinc Oxide



w/Bone Ash

2-3 Second Dips



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Lab 2-Alkaline Earth-Reduction



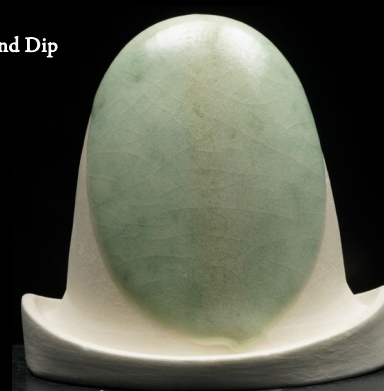
070922-1



070922-16



070922-17



070922-18



070922-19



070922-20

1-3 Second Dip

2-3 Second Dips



Original (W)



w/Talc



w/Mag Carb



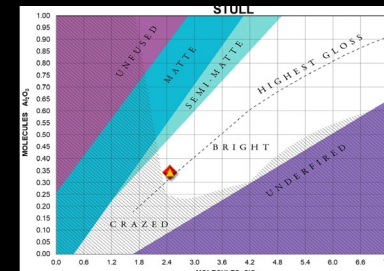
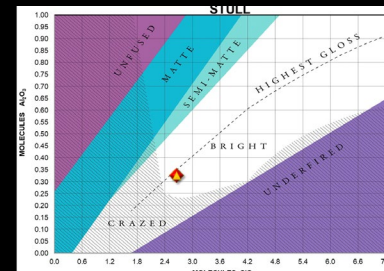
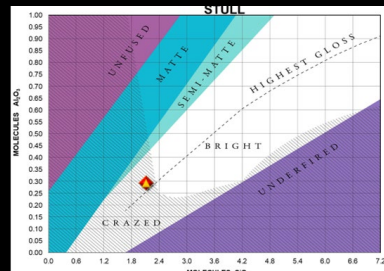
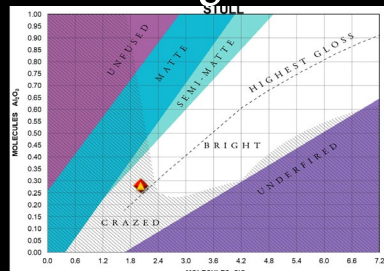
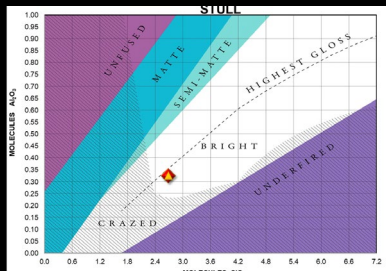
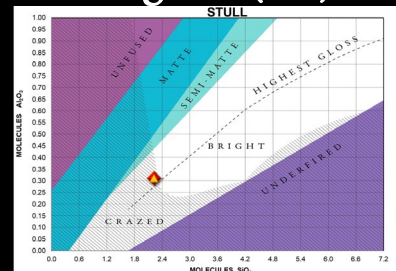
w/Dolomite



w/Wollastonite



w/Strontium Carb



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Lab 2-Alkaline Earth-Reduction



070922-1



070922-21



070922-22



070922-23

1-3 Second Dip

2-3 Second Dips



Original (W)



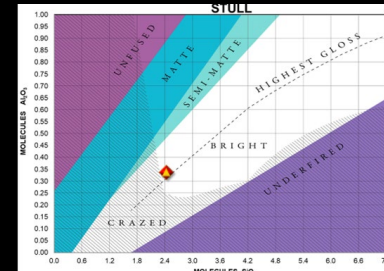
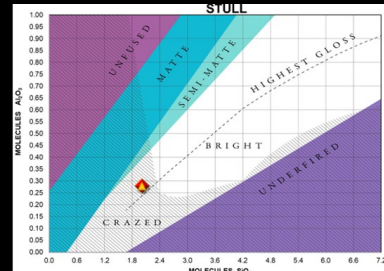
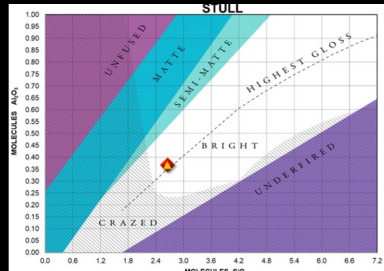
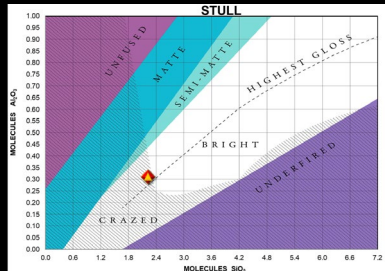
w/Barium Carb



w/Zinc Oxide



w/Bone Ash



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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

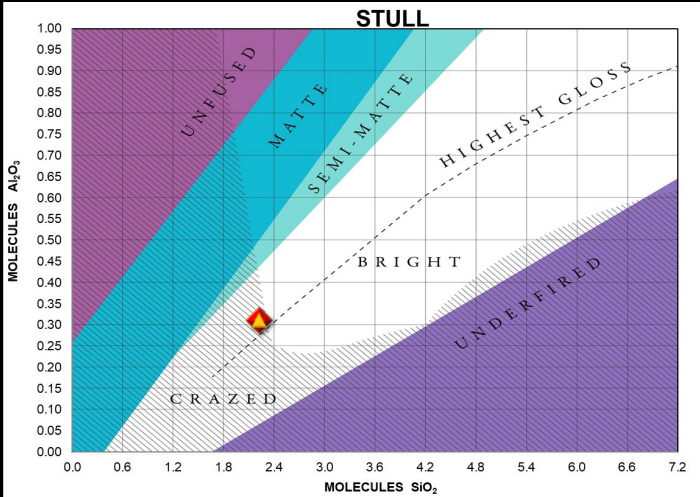


Reduction



UMF

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



EUMF

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



Ceramic
Materials
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Heart of Glass

Weight Substitutio
Custer Feldspar

070922-8

Custer	40.34
Whiting	14.34
Zinc Oxide	12.55
EPK	9.05
Flint	23.00
Copper Carbonate	1.00
Water	70



Oxidation

1-3 Second Dip



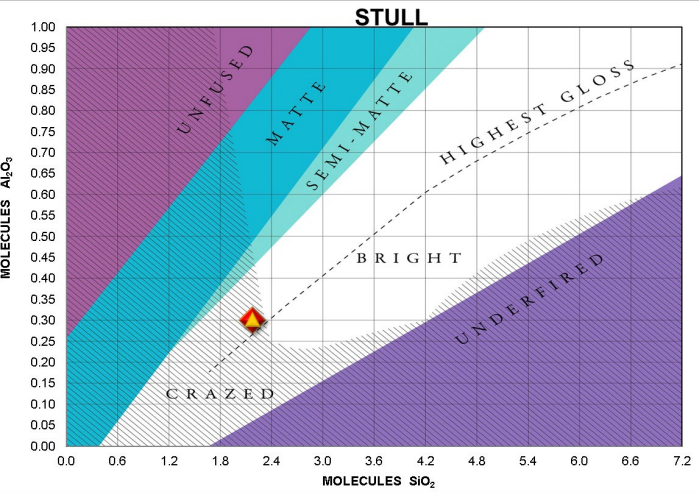
2-3 Second Dips



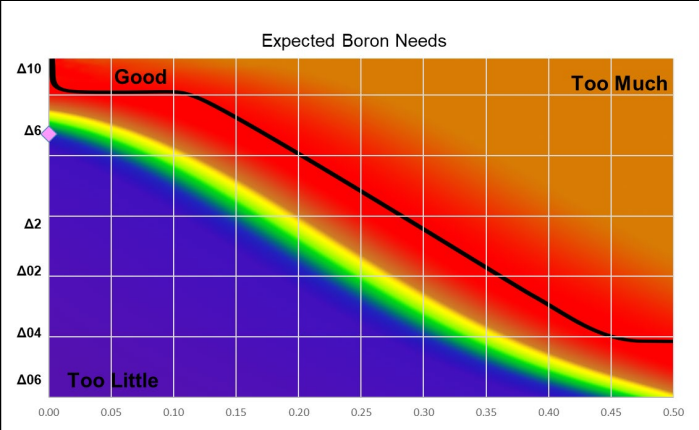
Reduction



SiO ₂ :Al ₂ O ₃ Ratio 7.19 :1		Alkali Metals 0.21		Alkaline Earths 0.79	
SiO ₂ 2.22	Collective "Al ₂ O ₃ " 0.31	Na ₂ O 0.05	K ₂ O 0.16	MgO 0.00	CaO 0.37
B ₂ O ₃	Al ₂ O ₃ 0.31	Li ₂ O	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.40	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



SiO ₂ :Al ₂ O ₃ Ratio 7.19 :1		Alkali Metals 0.23		Alkaline Earths 0.77	
SiO ₂ 2.18	Collective "Al ₂ O ₃ " 0.30	Na ₂ O 0.05	K ₂ O 0.16	MgO 0.00	CaO 0.36
B ₂ O ₃	Al ₂ O ₃ 0.30	Li ₂ O	CuO 0.02	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.39	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



Ceramic
Materials
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Heart of Glass

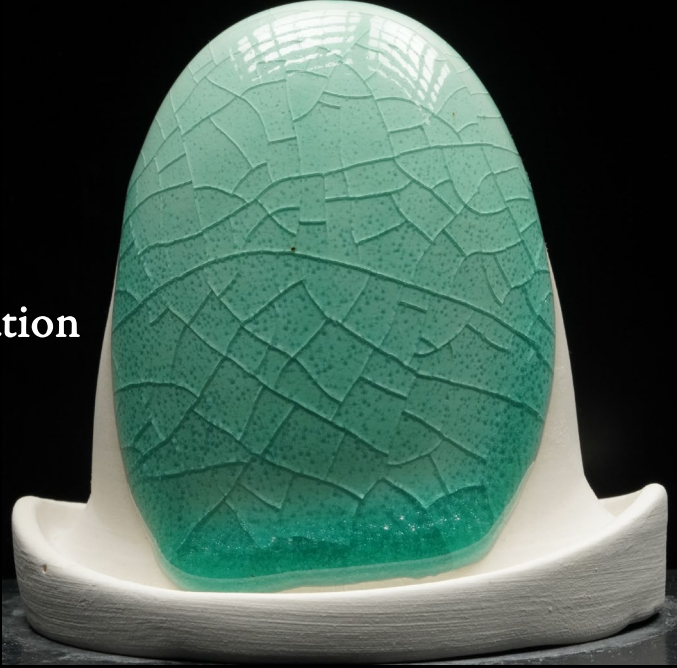
Weight Substitution
Mahavir Feldspar

070922-9

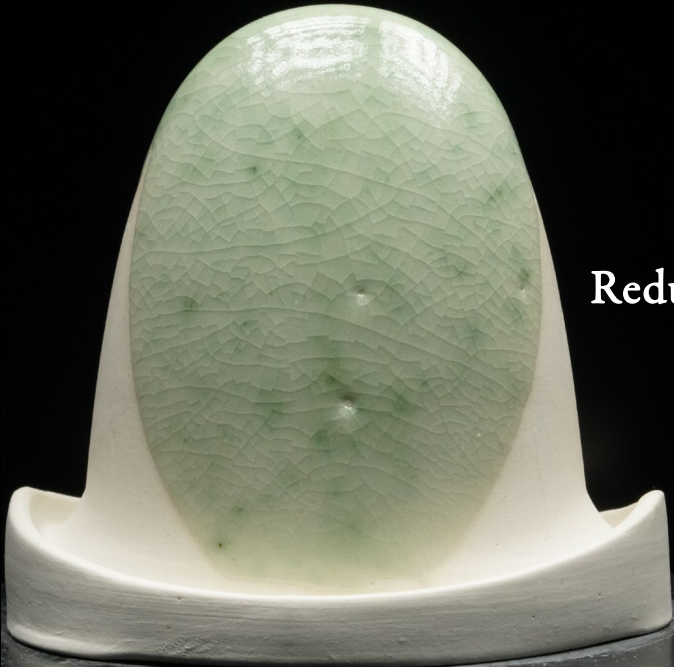
Mahavir	40.63
Whiting	14.45
Zinc Oxide	12.64
EPK	9.12
Flint	23.17
Copper Carbonate	1.01
Water	70



1-3 Second Dip



2-3 Second Dips

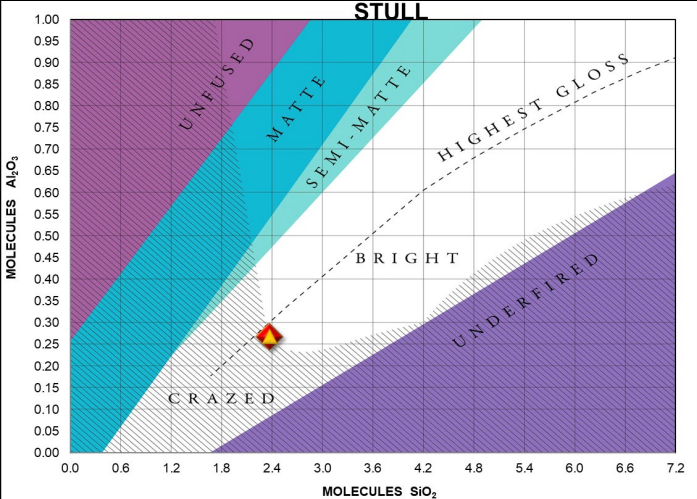


Reduction



Oxidation

SiO ₂ :Al ₂ O ₃ Ratio 8.82 : 1		Alkali Metals 0.19		Alkaline Earths 0.81	
SiO ₂ 2.42	Collective "Al ₂ O ₃ " 0.27	Na ₂ O 0.05	K ₂ O 0.13	MgO 0.01	CaO 0.39
B ₂ O ₃	Al ₂ O ₃ 0.27	Li ₂ O	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.41	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



SiO ₂ :Al ₂ O ₃ Ratio 8.82 : 1		Alkali Metals 0.20		Alkaline Earths 0.80	
SiO ₂ 2.37	Collective "Al ₂ O ₃ " 0.27	Na ₂ O 0.05	K ₂ O 0.13	MgO 0.01	CaO 0.38
B ₂ O ₃	Al ₂ O ₃ 0.27	Li ₂ O	CuO 0.02	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.41	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



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Heart of Glass

Weight Substitution
G200 EU Feldspar

070922-10

G200 EU	40.63
Whiting	14.45
Zinc Oxide	12.64
EPK	9.12
Flint	23.17
Copper Carbonate	1.01
Water	70



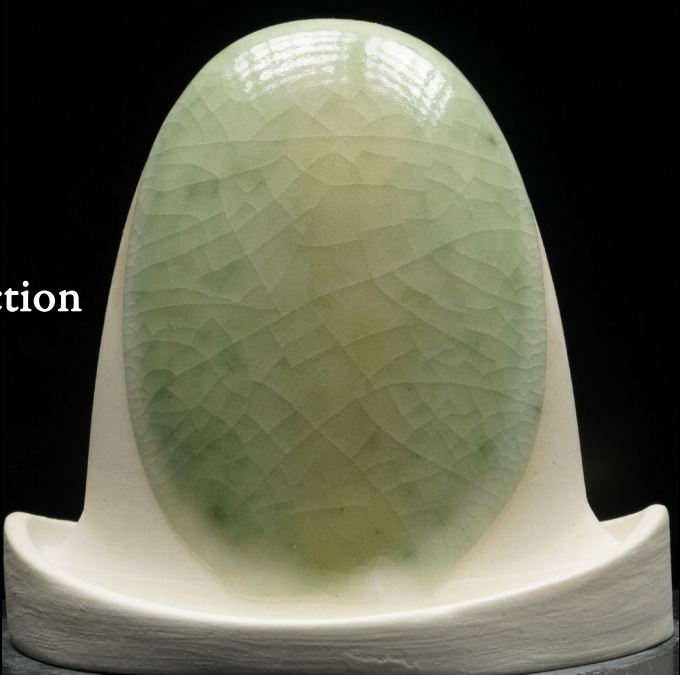
1-3 Second Dip



2-3 Second Dips



1-3 Second Dip

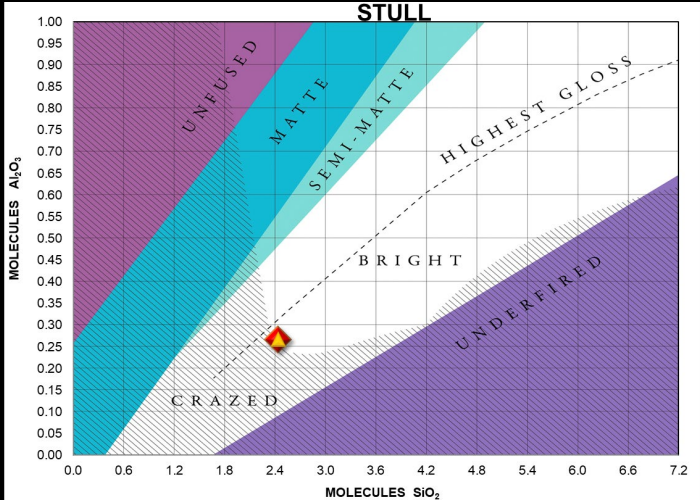


2-3 Second Dips

Oxidation

Reduction

SiO ₂ :Al ₂ O ₃ Ratio 9.10 : 1		Alkali Metals 0.17		Alkaline Earths 0.83	
SiO ₂ 2.49	Collective "Al ₂ O ₃ " 0.27	Na ₂ O 0.04	K ₂ O 0.13	MgO 0.00	CaO 0.40
B ₂ O ₃	Al ₂ O ₃ 0.27	Li ₂ O	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.42	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



SiO ₂ :Al ₂ O ₃ Ratio 9.10 : 1		Alkali Metals 0.19		Alkaline Earths 0.81	
SiO ₂ 2.44	Collective "Al ₂ O ₃ " 0.27	Na ₂ O 0.04	K ₂ O 0.13	MgO 0.00	CaO 0.39
B ₂ O ₃	Al ₂ O ₃ 0.27	Li ₂ O	CuO 0.02	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.41	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



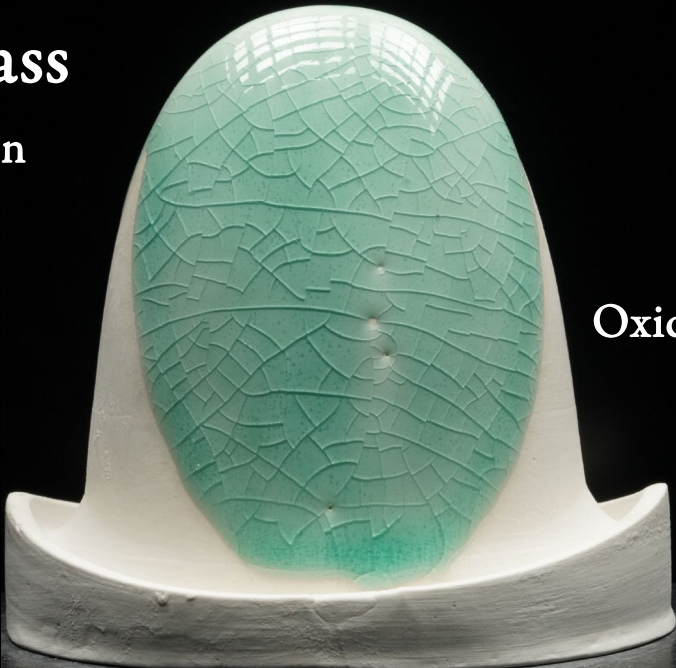
Ceramic
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Heart of Glass

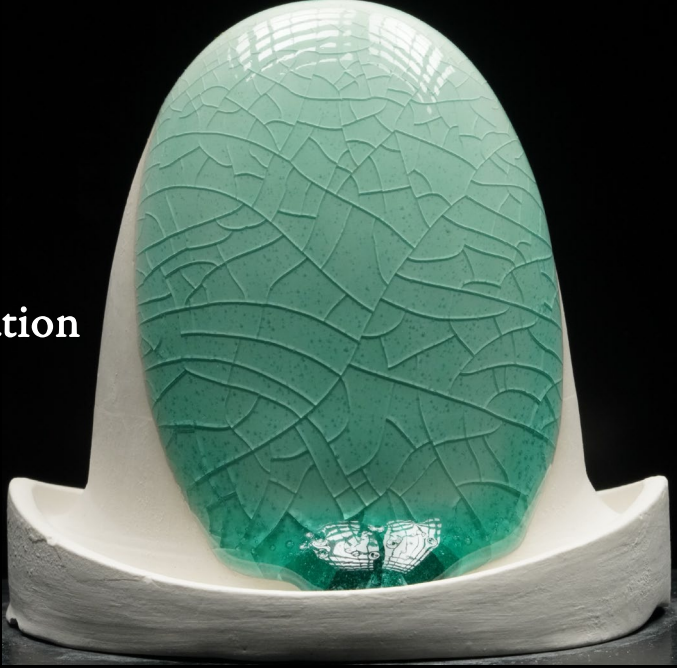
Weight Substitution
Minspar Feldspar

070922-11

Minspar	40.63
Whiting	14.45
Zinc Oxide	12.64
EPK	9.12
Flint	23.17
Copper Carbonate	1.01
Water	70



1-3 Second Dip



2-3 Second Dips



Reduction

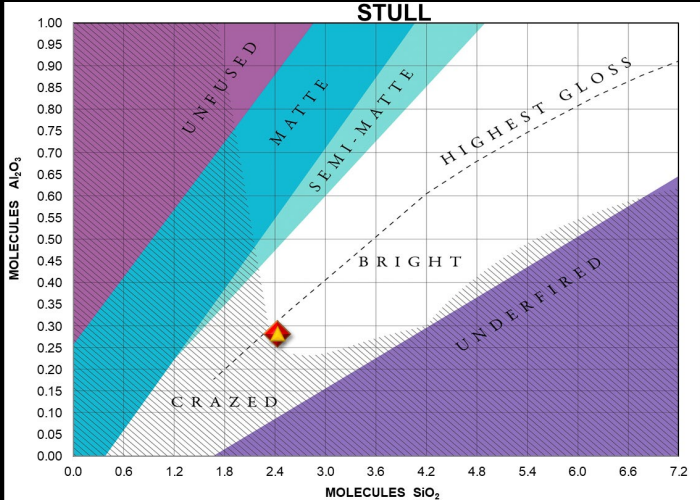


Reduction

Oxidation

UMF

SiO ₂ :Al ₂ O ₃ Ratio 8.57 : 1		Alkali Metals 0.16		Alkaline Earths 0.84	
SiO ₂ 2.49	Collective "Al ₂ O ₃ " 0.29	Na ₂ O 0.11	K ₂ O 0.05	MgO 0.00	CaO 0.42
B ₂ O ₃	Al ₂ O ₃ 0.29	Li ₂ O	CuO	SrO 0.00	BaO 0.00
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.42	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



EUMF

SiO ₂ :Al ₂ O ₃ Ratio 8.57 : 1		Alkali Metals 0.18		Alkaline Earths 0.82	
SiO ₂ 2.43	Collective "Al ₂ O ₃ " 0.28	Na ₂ O 0.11	K ₂ O 0.05	MgO 0.00	CaO 0.41
B ₂ O ₃	Al ₂ O ₃ 0.28	Li ₂ O	CuO	SrO 0.00	BaO 0.00
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.41	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



Ceramic
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Heart of Glass

Weight Substitution
Spodumene

070922-12

Spodumene	40.63
Whiting	14.45
Zinc Oxide	12.64
EPK	9.12
Flint	23.17
Copper Carbonate	1.01
Water	70



1-3 Second Dip



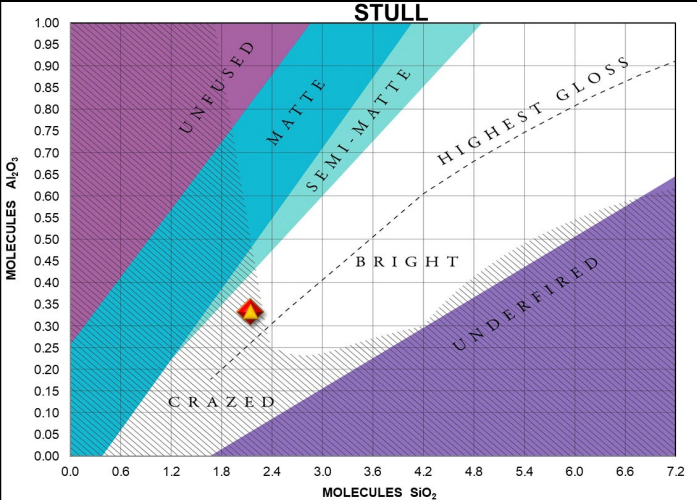
2-3 Second Dips



Reduction



UMF		Alkali Metals		Alkaline Earths	
SiO ₂ :Al ₂ O ₃ Ratio 6.41 : 1		0.26		0.74	
SiO ₂ 2.19	Collective "Al ₂ O ₃ " 0.34	Na ₂ O 0.00	K ₂ O 0.00	MgO 0.00	CaO 0.35
B ₂ O ₃	Al ₂ O ₃ 0.34	Li ₂ O	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.38	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



EUMF		Alkali Metals		Alkaline Earths	
SiO ₂ :Al ₂ O ₃ Ratio 6.41 : 1		0.27		0.73	
SiO ₂ 2.15	Collective "Al ₂ O ₃ " 0.33	Na ₂ O 0.00	K ₂ O 0.00	MgO 0.00	CaO 0.35
B ₂ O ₃	Al ₂ O ₃ 0.33	Li ₂ O 0.25	CuO 0.02	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.37	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO

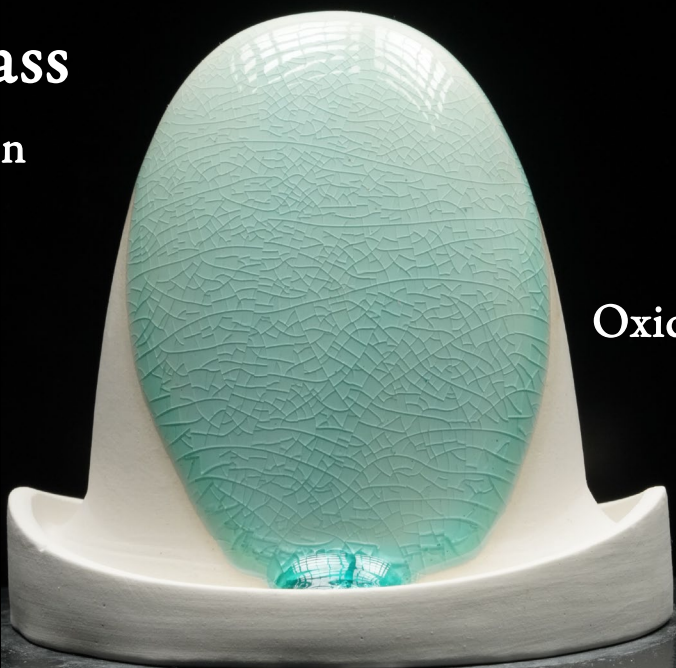


Heart of Glass

Weight Substitution
Frit 3110

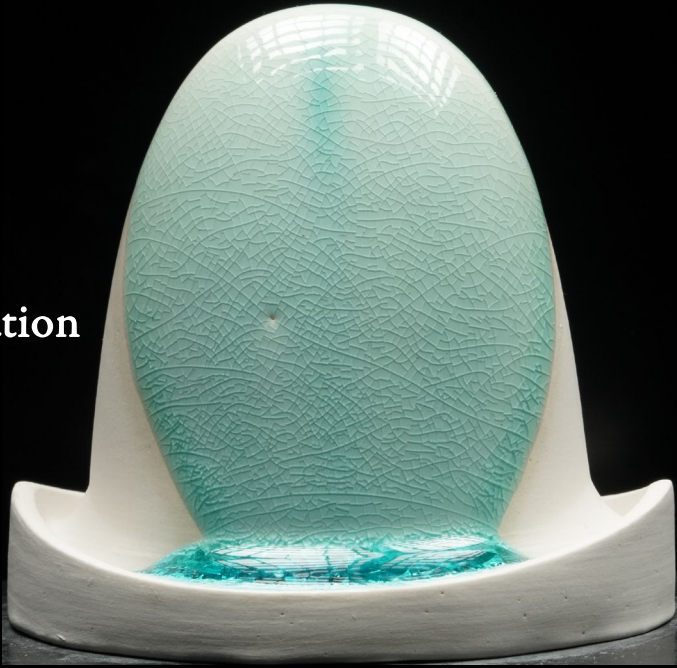
070922-14

3110	40.63
Whiting	14.45
Zinc Oxide	12.64
EPK	9.12
Flint	23.17
Copper Carbonate	1.01
Water	60



Oxidation

1-3 Second Dip

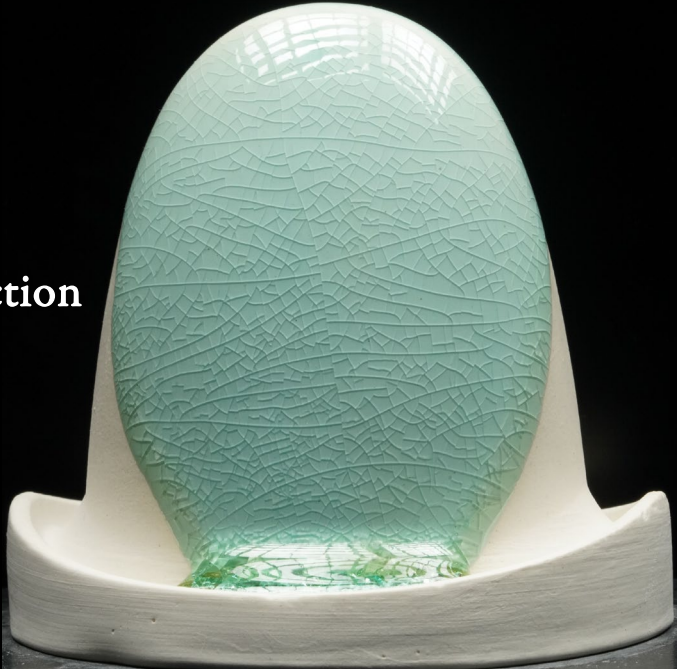


2-3 Second Dips



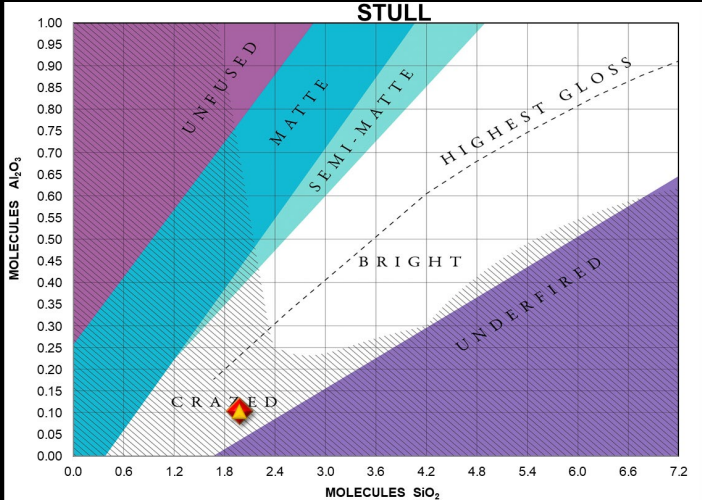
Reduction

1-3 Second Dip



2-3 Second Dips

SiO ₂ :Al ₂ O ₃ Ratio 18.90 : 1		Alkali Metals 0.24		Alkaline Earths 0.76	
SiO ₂ 2.02	Collective "Al ₂ O ₃ " 0.11	Na ₂ O 0.22	K ₂ O 0.02	MgO 0.00	CaO 0.41
B ₂ O ₃ 0.03	Al ₂ O ₃ 0.11	Li ₂ O	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.34	FeO 0.00
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



SiO ₂ :Al ₂ O ₃ Ratio 18.90 : 1		Alkali Metals 0.26		Alkaline Earths 0.74	
SiO ₂ 1.98	Collective "Al ₂ O ₃ " 0.10	Na ₂ O 0.22	K ₂ O 0.02	MgO 0.00	CaO 0.41
B ₂ O ₃ 0.03	Al ₂ O ₃ 0.10	Li ₂ O	CuO 0.02	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.33	FeO 0.00
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



Heart of Glass

Weight Substitution
Lithium Carbonate

070922-15

Lithium Carb	40.63
Whiting	14.45
Zinc Oxide	12.64
EPK	9.12
Flint	23.17
Copper Carbonate	1.01
Water	70



1-3 Second Dip



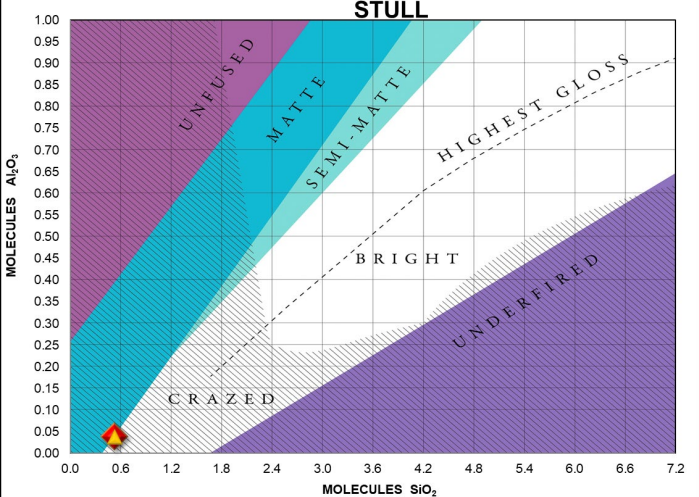
2-3 Second Dips



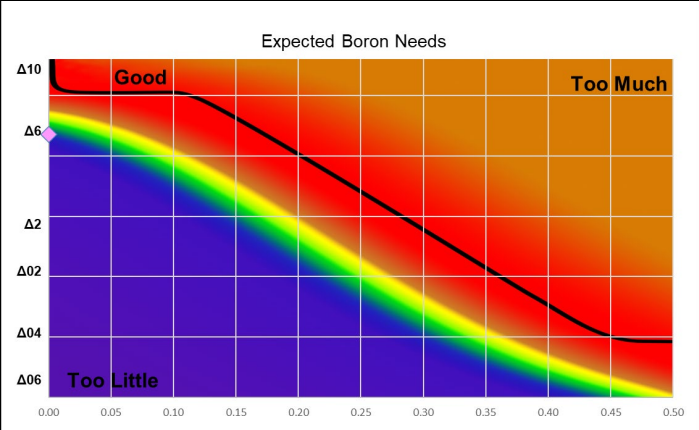
Reduction



SiO ₂ :Al ₂ O ₃ Ratio 13.66 : 1		Alkali Metals 0.65		Alkaline Earths 0.35	
SiO ₂ 0.53	Collective "Al ₂ O ₃ " 0.04	Na ₂ O	K ₂ O 0.00	MgO 0.00	CaO 0.17
B ₂ O ₃	Al ₂ O ₃ 0.04	Li ₂ O 0.65	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.18	FeO 0.00
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



SiO ₂ :Al ₂ O ₃ Ratio 13.66 : 1		Alkali Metals 0.65		Alkaline Earths 0.35	
SiO ₂ 0.53	Collective "Al ₂ O ₃ " 0.04	Na ₂ O	K ₂ O 0.00	MgO 0.00	CaO 0.17
B ₂ O ₃	Al ₂ O ₃ 0.04	Li ₂ O 0.64	CuO 0.01	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.18	FeO 0.00
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



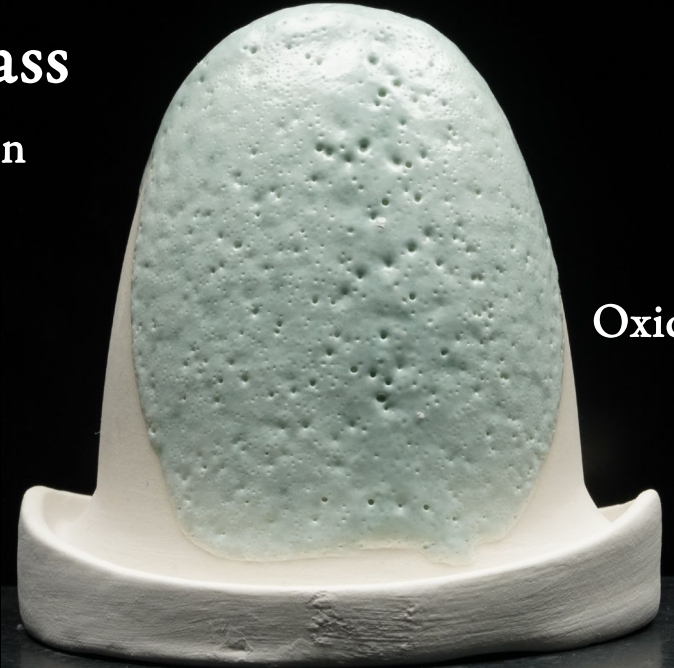
Ceramic
Materials
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Heart of Glass

Weight Substitution
Talc

070922-16

Neph Sy	40.63
Talc	14.45
Zinc Oxide	12.64
EPK	9.12
Flint	23.17
Copper Carbonate	1.01
Water	70



1-3 Second Dip



2-3 Second Dips

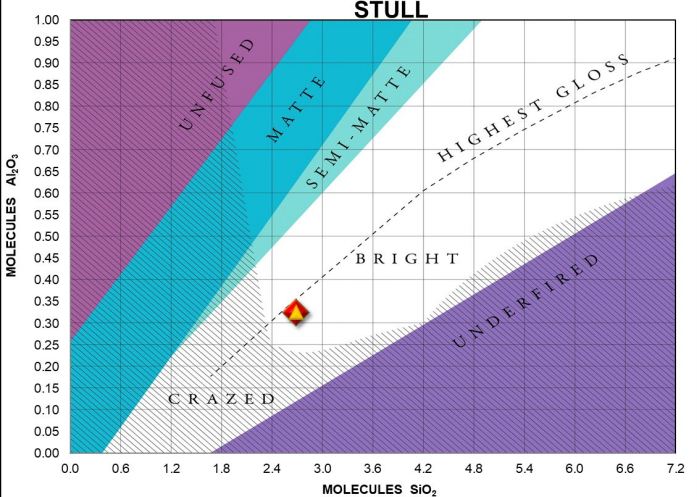


Reduction



Reduction

SiO ₂ :Al ₂ O ₃ Ratio 8.23 : 1		Alkali Metals 0.24		Alkaline Earths 0.76	
SiO ₂ 2.75	Collective "Al ₂ O ₃ " 0.33	Na ₂ O 0.19	K ₂ O 0.05	MgO 0.29	CaO 0.03
B ₂ O ₃	Al ₂ O ₃ 0.33	Li ₂ O	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.43	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



SiO ₂ :Al ₂ O ₃ Ratio 8.23 : 1		Alkali Metals 0.23		Alkaline Earths 0.77	
SiO ₂ 2.69	Collective "Al ₂ O ₃ " 0.33	Na ₂ O 0.18	K ₂ O 0.05	MgO 0.29	CaO 0.03
B ₂ O ₃	Al ₂ O ₃ 0.32	Li ₂ O	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.42	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO 0.02



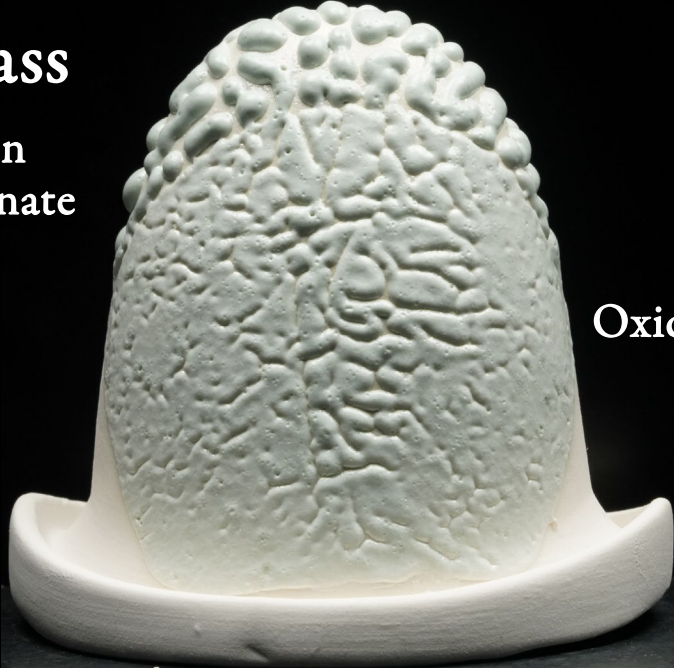
Ceramic
Materials
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Heart of Glass

Weight Substitution
Magnesium Carbonate

070922-17

Neph Sy	40.63
Mag Carbonate	14.45
Zinc Oxide	12.64
EPK	9.12
Flint	23.17
Copper Carbonate	1.01
Water	130



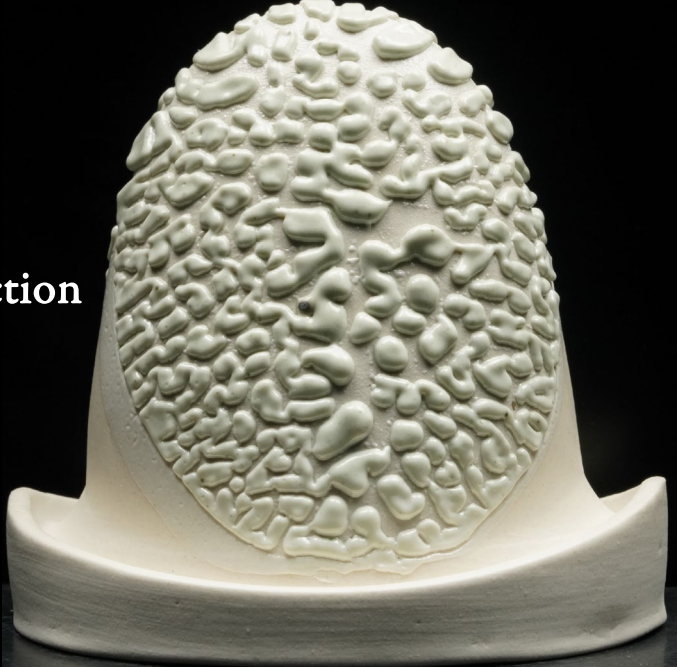
1-3 Second Dip



2-3 Second Dips

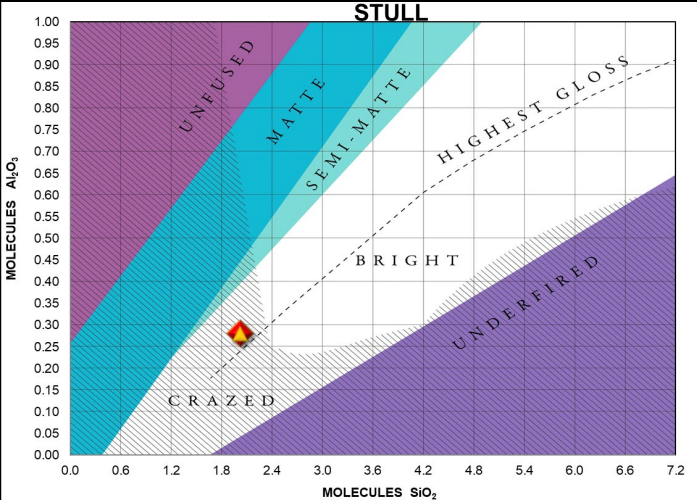


Reduction



Oxidation

SiO ₂ :Al ₂ O ₃ Ratio 7.19 : 1		Alkali Metals 0.21		Alkaline Earths 0.79	
SiO ₂ 2.07	Collective "Al ₂ O ₃ " 0.29	Na ₂ O 0.16	K ₂ O 0.05	MgO 0.42	CaO 0.01
B ₂ O ₃	Al ₂ O ₃ 0.29	Li ₂ O	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.37	FeO 0.00
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



SiO ₂ :Al ₂ O ₃ Ratio 7.19 : 1		Alkali Metals 0.20		Alkaline Earths 0.80	
SiO ₂ 2.02	Collective "Al ₂ O ₃ " 0.28	Na ₂ O 0.16	K ₂ O 0.04	MgO 0.41	CaO 0.01
B ₂ O ₃	Al ₂ O ₃ 0.28	Li ₂ O	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.36	FeO 0.00
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO 0.02



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Heart of Glass

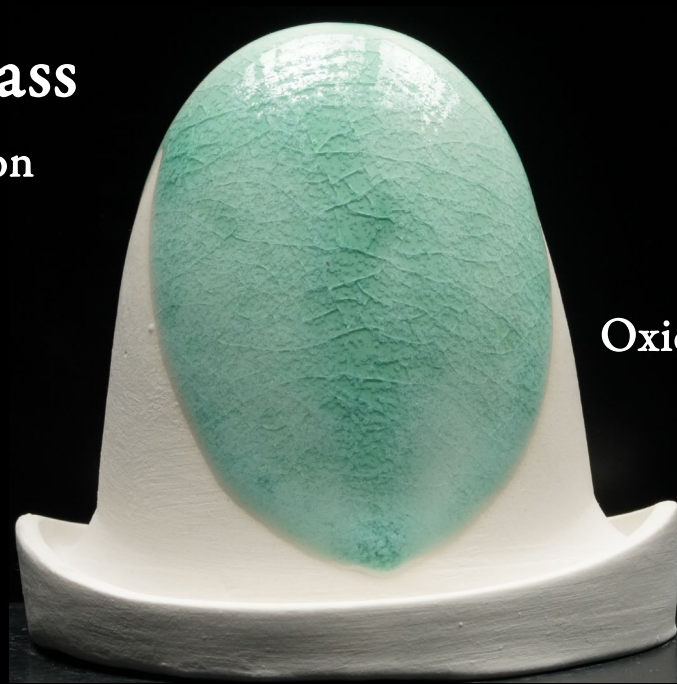
Weight Substitution
Dolomite

070922-18

Neph Sy	40.63
Dolomite	14.45
Zinc Oxide	12.64
EPK	9.12
Flint	23.17
Copper Carbonate	1.01
Water	70



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1-3 Second Dip



2-3 Second Dips



Reduction

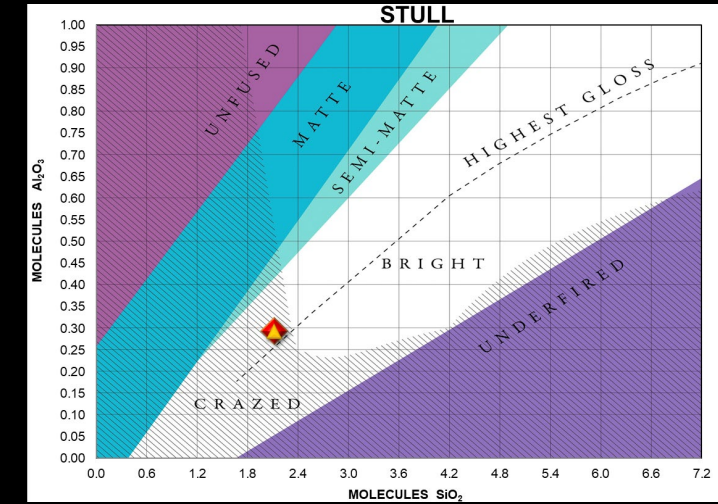


Oxidation

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UMF

SiO ₂ :Al ₂ O ₃ Ratio 7.20 : 1		Alkali Metals 0.21		Alkaline Earths 0.79	
SiO ₂ 2.16	Collective "Al ₂ O ₃ " 0.30	Na ₂ O 0.17	K ₂ O 0.05	MgO 0.20	CaO 0.20
B ₂ O ₃	Al ₂ O ₃ 0.30	Li ₂ O	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.38	FeO 0.00
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



EUMF

SiO ₂ :Al ₂ O ₃ Ratio 7.20 : 1		Alkali Metals 0.21		Alkaline Earths 0.79	
SiO ₂ 2.12	Collective "Al ₂ O ₃ " 0.29	Na ₂ O 0.16	K ₂ O 0.05	MgO 0.19	CaO 0.20
B ₂ O ₃	Al ₂ O ₃ 0.29	Li ₂ O	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.38	FeO 0.00
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO 0.02

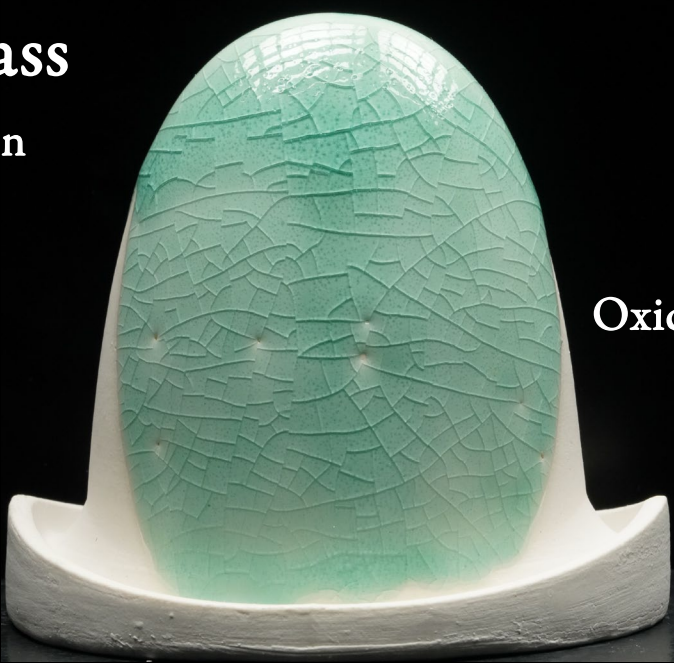


Heart of Glass

Weight Substitution
Wollastonite

070922-19

Neph Sy	40.63
Wollastonite	14.45
Zinc Oxide	12.64
EPK	9.12
Flint	23.17
Copper Carbonate	1.01
Water	75



1-3 Second Dip



2-3 Second Dips

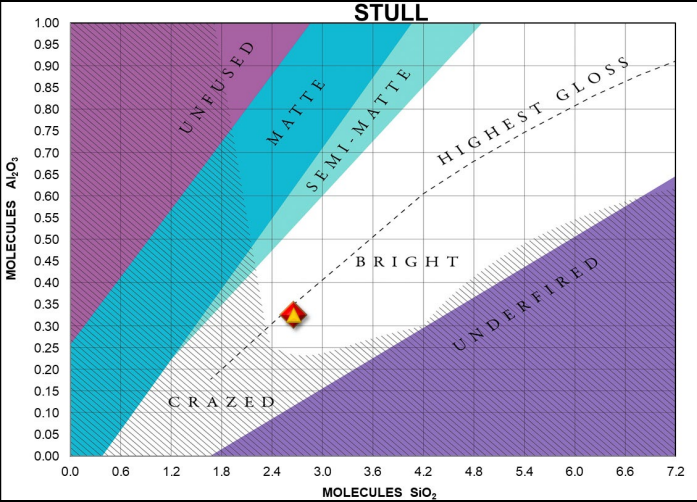


Reduction



Oxidation

UMF		Alkali Metals		Alkaline Earths	
SiO ₂ :Al ₂ O ₃ Ratio 8.12 : 1		0.24		0.76	
SiO ₂ 2.72	Collective "Al ₂ O ₃ " 0.33	Na ₂ O 0.19	K ₂ O 0.05	MgO 0.01	CaO 0.31
B ₂ O ₃	Al ₂ O ₃ 0.33	Li ₂ O	CuO	SrO	BaO
TiO ₂	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.42	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



EUMF		Alkali Metals		Alkaline Earths	
SiO ₂ :Al ₂ O ₃ Ratio 8.12 : 1		0.23		0.77	
SiO ₂ 2.66	Collective "Al ₂ O ₃ " 0.33	Na ₂ O 0.18	K ₂ O 0.05	MgO 0.01	CaO 0.31
B ₂ O ₃	Al ₂ O ₃ 0.33	Li ₂ O	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.42	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO 0.02

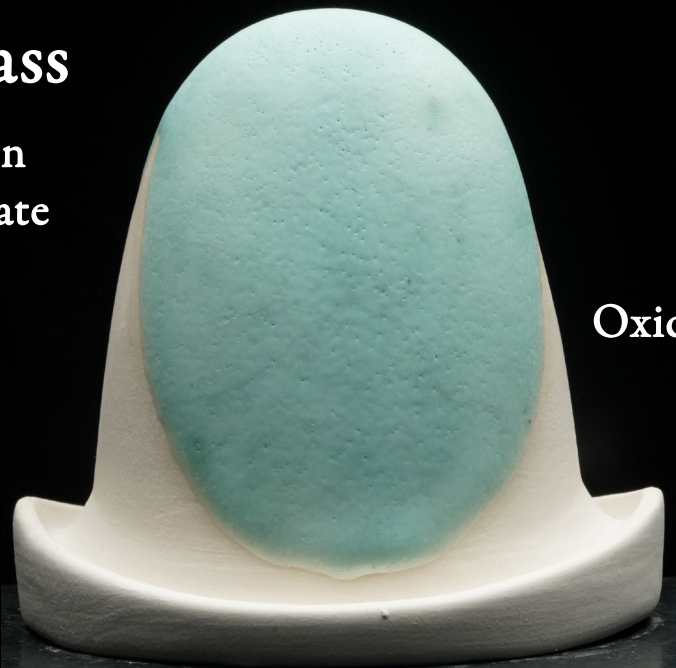


Ceramic
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Heart of Glass

Weight Substitution
Strontium Carbonate
070922-20

Neph Sy	40.63
Strontium Carb	14.45
Zinc Oxide	12.64
EPK	9.12
Flint	23.17
Copper Carbonate	1.01
Water	60



1-3 Second Dip



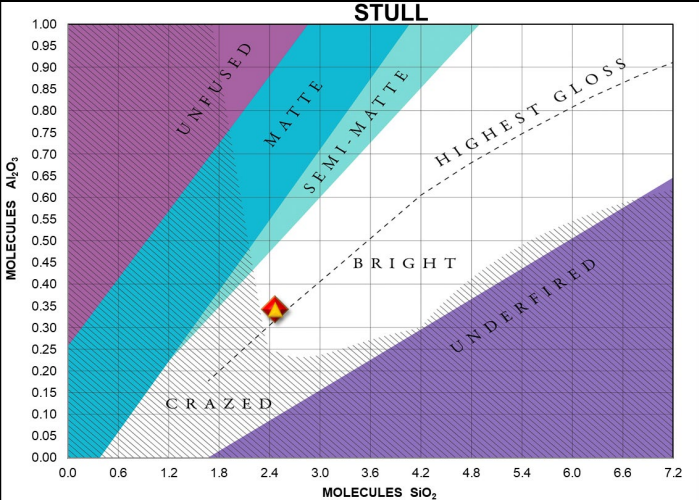
2-3 Second Dips



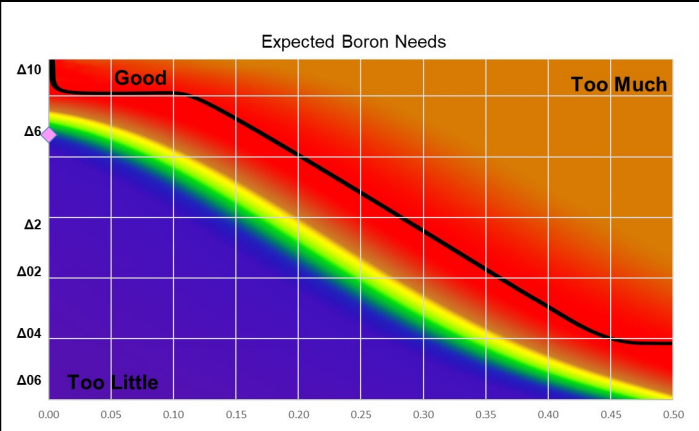
Reduction



SiO ₂ :Al ₂ O ₃ Ratio 7.20 : 1		Alkali Metals 0.25		Alkaline Earths 0.75	
SiO ₂ 2.53	Collective "Al ₂ O ₃ " 0.35	Na ₂ O 0.20	K ₂ O 0.06	MgO 0.00	CaO 0.01
B ₂ O ₃	Al ₂ O ₃ 0.35	Li ₂ O	CuO	SrO 0.28	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.45	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



SiO ₂ :Al ₂ O ₃ Ratio 7.20 : 1		Alkali Metals 0.25		Alkaline Earths 0.75	
SiO ₂ 2.47	Collective "Al ₂ O ₃ " 0.34	Na ₂ O 0.19	K ₂ O 0.05	MgO 0.00	CaO 0.01
B ₂ O ₃	Al ₂ O ₃ 0.34	Li ₂ O	CuO	SrO 0.28	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.44	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO 0.02

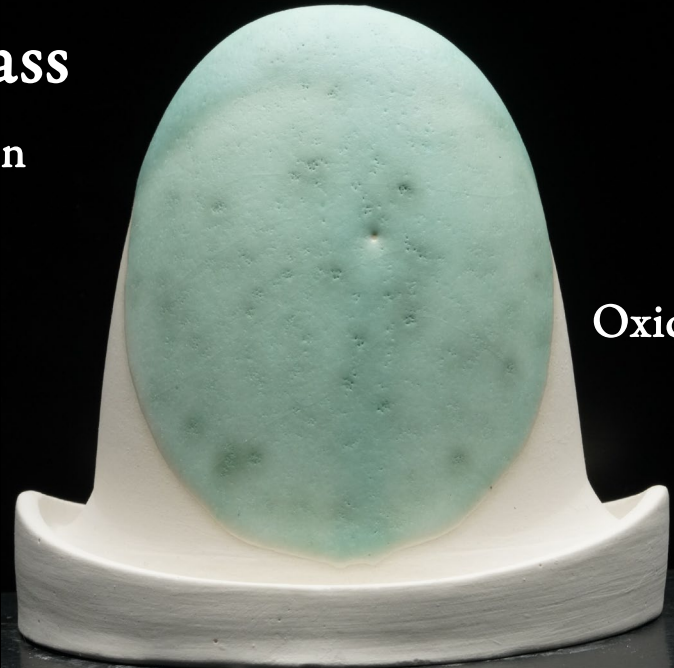


Ceramic
Materials
Workshop

Heart of Glass

Weight Substitution
Barium Carbonate
070922-21

Neph Sy	40.63
Barium Carb	14.45
Zinc Oxide	12.64
EPK	9.12
Flint	23.17
Copper Carbonate	1.01
Water	70



1-3 Second Dip



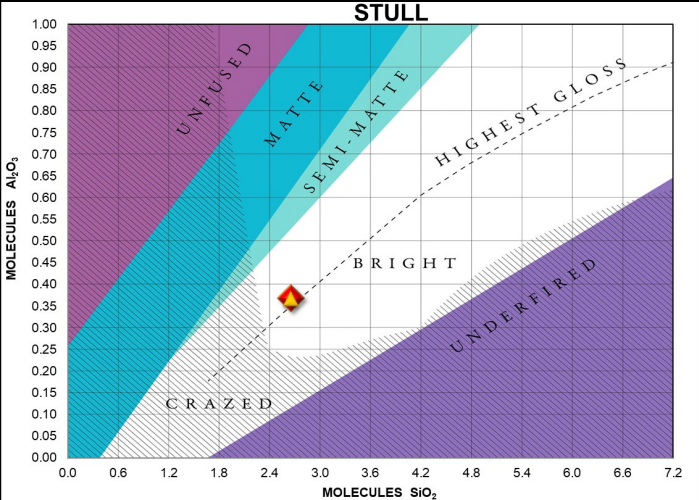
2-3 Second Dips



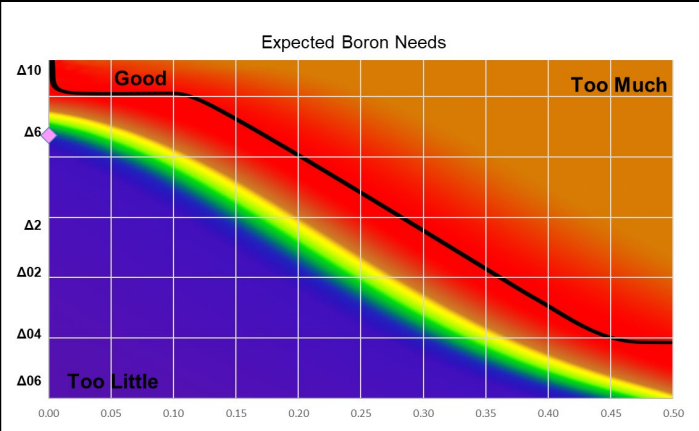
Reduction



SiO ₂ :Al ₂ O ₃ Ratio 7.20 : 1		Alkali Metals 0.27		Alkaline Earths 0.73	
SiO ₂ 2.72	Collective "Al ₂ O ₃ " 0.38	Na ₂ O 0.21	K ₂ O 0.06	MgO 0.00	CaO 0.01
B ₂ O ₃	Al ₂ O ₃ 0.38	Li ₂ O	CuO	SrO	BaO 0.23
TiO ₂	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.48	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



SiO ₂ :Al ₂ O ₃ Ratio 7.20 : 1		Alkali Metals 0.26		Alkaline Earths 0.74	
SiO ₂ 2.65	Collective "Al ₂ O ₃ " 0.37	Na ₂ O 0.20	K ₂ O 0.06	MgO 0.00	CaO 0.01
B ₂ O ₃	Al ₂ O ₃ 0.37	Li ₂ O	CuO	SrO	BaO 0.22
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.47	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO 0.03

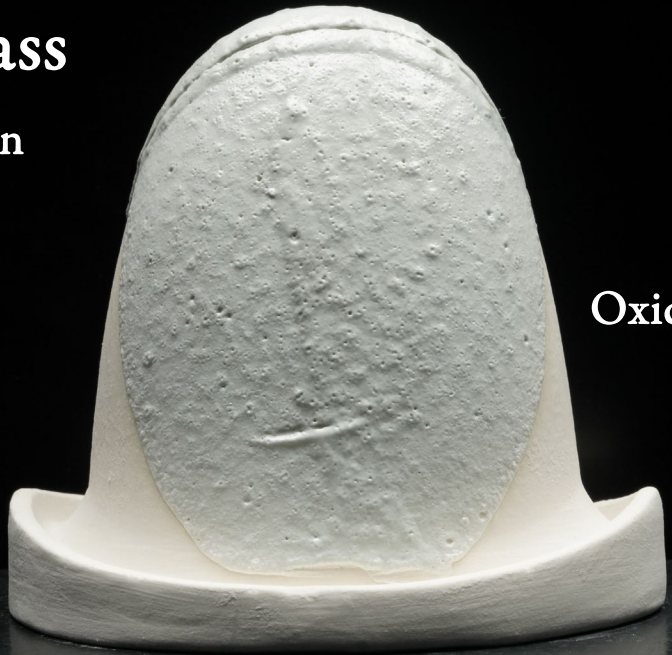


Ceramic
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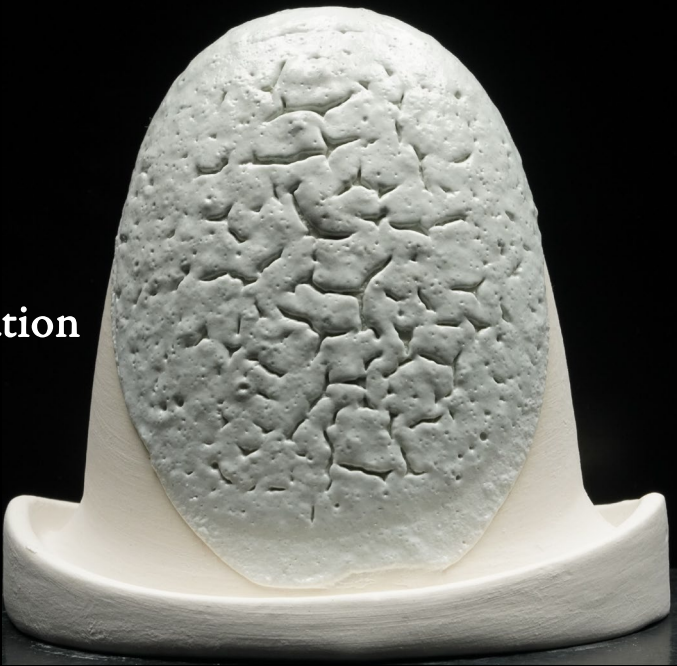
Heart of Glass

Weight Substitution
Zinc Oxide
070922-22

Neph Sy	40.63
Zinc Oxide	14.45
Zinc Oxide	12.64
EPK	9.12
Flint	23.17
Copper Carbonate	1.01
Water	70



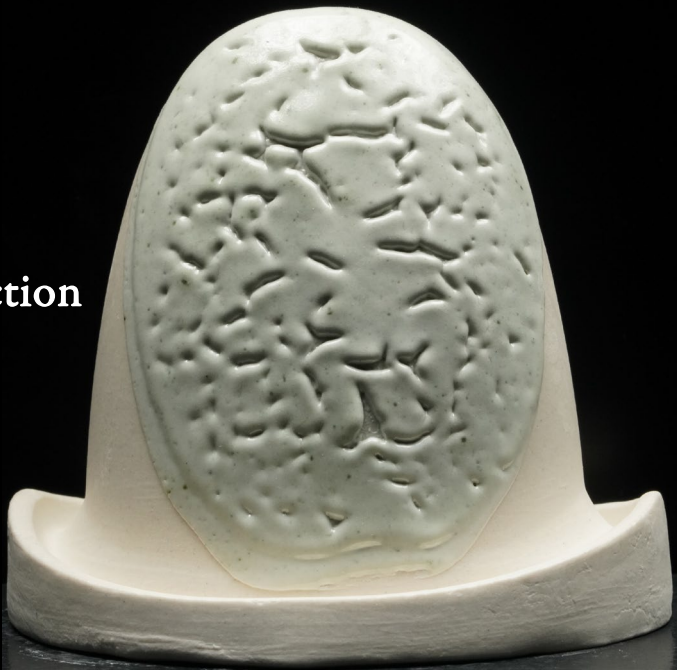
1-3 Second Dip



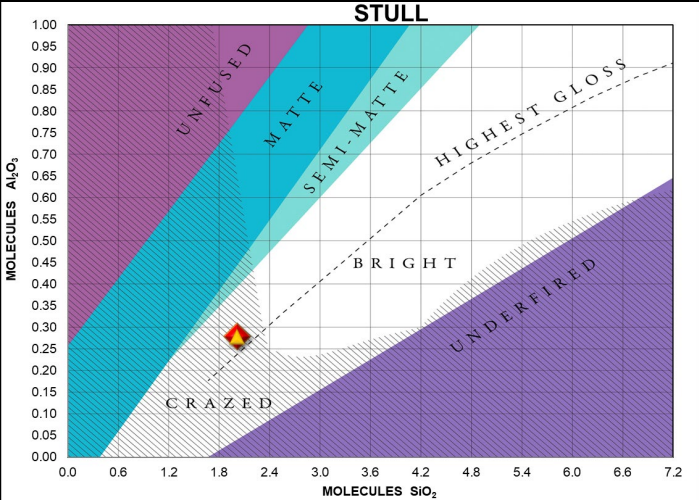
2-3 Second Dips



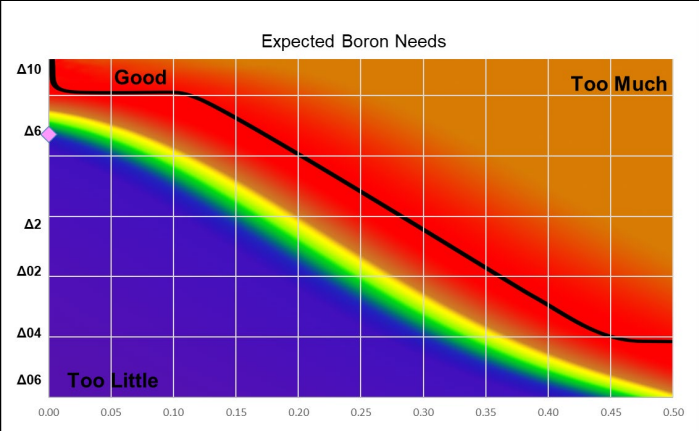
Reduction



SiO ₂ :Al ₂ O ₃ Ratio 7.20 : 1		Alkali Metals 0.20		Alkaline Earths 0.80	
SiO ₂ 2.06	Collective "Al ₂ O ₃ " 0.29	Na ₂ O 0.16	K ₂ O 0.05	MgO 0.00	CaO 0.01
B ₂ O ₃	Al ₂ O ₃ 0.28	Li ₂ O	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.78	FeO 0.00
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO



SiO ₂ :Al ₂ O ₃ Ratio 7.20 : 1		Alkali Metals 0.20		Alkaline Earths 0.80	
SiO ₂ 2.02	Collective "Al ₂ O ₃ " 0.28	Na ₂ O 0.16	K ₂ O 0.04	MgO 0.00	CaO 0.01
B ₂ O ₃	Al ₂ O ₃ 0.28	Li ₂ O	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.77	FeO 0.00
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅		MnO ₂	CoO 0.02



Ceramic
Materials
Workshop

Heart of Glass

Weight Substitution
Bone Ash

070922-23

Neph Sy	40.63
Bone Ash	14.45
Zinc Oxide	12.64
EPK	9.12
Flint	23.17
Copper Carbonate	1.01
Water	70



1-3 Second Dip



2-3 Second Dips



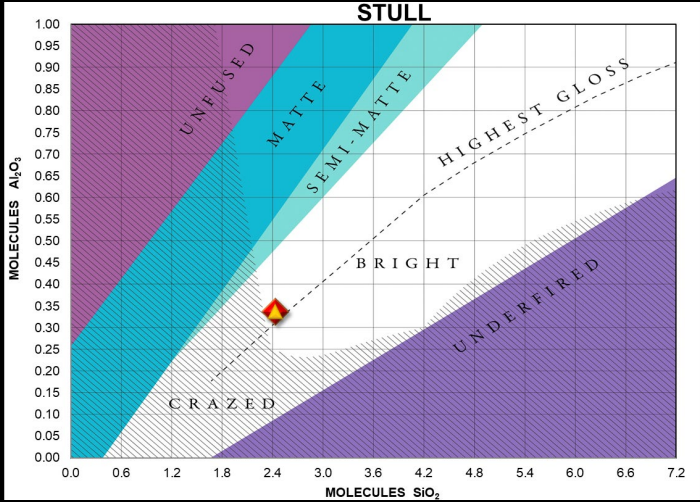
Reduction



Oxidation

UMF

SiO ₂ :Al ₂ O ₃ Ratio 7.21 : 1		Alkali Metals 0.25		Alkaline Earths 0.75	
SiO ₂ 2.50	Collective "Al ₂ O ₃ " 0.35	Na ₂ O 0.19	K ₂ O 0.06	MgO 0.00	CaO 0.30
B ₂ O ₃	Al ₂ O ₃ 0.34	Li ₂ O	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.44	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅ 0.16		MnO ₂	CoO



EUMF

SiO ₂ :Al ₂ O ₃ Ratio 7.21 : 1		Alkali Metals 0.24		Alkaline Earths 0.76	
SiO ₂ 2.44	Collective "Al ₂ O ₃ " 0.34	Na ₂ O 0.19	K ₂ O 0.05	MgO 0.00	CaO 0.29
B ₂ O ₃	Al ₂ O ₃ 0.34	Li ₂ O	CuO	SrO	BaO
TiO ₂ 0.00	NiO	Bi ₂ O ₃	SnO ₂	ZnO 0.43	FeO 0.01
Cr ₂ O ₃	ZrO ₂	P ₂ O ₅ 0.16		MnO ₂	CoO 0.02



Ceramic
Materials
Workshop