

Supplemental Information for “ISG-2: Properties of the Second International Simple Glass”

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SECTION 1 – Institution List

The following countries and institutions were represented at the 2019 International Workshop on Long-Term Glass Corrosion:

- USA: Pacific Northwest National Laboratory, WA (7 participants), Washington River Protection Solutions, WA (2 participants), University of California – Los Angeles, CA (2 participants), University of North Texas, TX (4 participants), Argonne National Laboratory, IL (1 participant), Oak Ridge National Laboratory, TN (1 participant), Ohio State University, OH (1 participant), Catholic University, DC (2 participants), Corning Inc., NY (5 participants), Rutgers University, NJ (3 participants)
- United Kingdom: Nuclear National Laboratory (1 participant), University of Sheffield (1 participant), University of Huddersfield (1 participant)
- France: CEA - Alternative Energies and Atomic Energy Commission (1 participant)
- Belgium: SKC·CEN (Belgium, 1 participant),
- Germany: Bonn University (1 participant), Köln University (1 participant).

SECTION 2 – Supplemental data

Supplementary Table 1: Concentrations of trace-level tramp elements of ISG-1, ISG-2, and transition glasses, as analyzed by EPMA and XRF and reported in wt% oxide.

ISG-1									
	HfO ₂	P ₂ O ₅	SO ₃	SnO ₂	Cl	Fe ₂ O ₃	K ₂ O	MnO ₂	TiO ₂
PNNL EPMA	0.07	0.01	0.01	0.08	0.01	0.01	0.01	0.01	0.01
Corning	0.05	0.01	0.01	0.085	0.007	0.01	0.007	0.008	0.008
ISG-1.25									
	HfO ₂	P ₂ O ₅	SO ₃	SnO ₂	Cl	Fe ₂ O ₃	K ₂ O	MnO ₂	TiO ₂
PNNL EPMA	0.04	0.01	0.02	0.09	0.01	0.01	0.01	0.01	0.01
Corning	0.05	0.01	0.013	0.096	0.009	0.009	0.007	0.007	0.007
ISG-1.5									
	HfO ₂	P ₂ O ₅	SO ₃	SnO ₂	Cl	Fe ₂ O ₃	K ₂ O	MnO ₂	TiO ₂
PNNL EPMA	0.07	0.01	0.01	0.06	0.01	0.01	0.01	0.01	0.01
Corning	0.05	0.01	0	0.068	0.009	0.01	0.007	0.006	0.007
ISG-1.75									
	HfO ₂	P ₂ O ₅	SO ₃	SnO ₂	Cl	Fe ₂ O ₃	K ₂ O	MnO ₂	TiO ₂
PNNL EPMA	0.04	0.00	0.00	0.08	0.01	0.01	0.01	0.01	0.01
Corning	0.05	0.01	0	0.068	0.009	0.01	0.007	0.006	0.007
ISG-2									
	HfO ₂	P ₂ O ₅	SO ₃	SnO ₂	Cl	Fe ₂ O ₃	K ₂ O	MnO ₂	TiO ₂
PNNL EPMA	0.04	0.01	0.01	0.05	0.04	0.01	0.01	0.01	0.01
Corning	0.05	0.01	0.005	0.058	0.041	0.01	0.006	0.009	0.008

Supplementary Table 2: Summary of mean analyzed compositions for the transition glasses measured across 2 labs. Average over multiple samples, using the indicated analytical techniques.

Glass	Lab	Technique	Glass Composition (wt%)									Total
			[Mean of multiple measurements/samples]									
			Al ₂ O ₃	B ₂ O ₃	CaO	La ₂ O ₃	MgO	Na ₂ O	SiO ₂	ZrO ₂	Others	
ISG-1.25	PNNL	EPMA	5.8	16.8	4.2	0.16	0.5	11.7	56.8	3.1	0.19	99.3
	Corning	XRF+ICP-OES	6.1	17.3	4.3	0.15	0.5	11.8	56.4	3.3	0.21	100.2
ISG-1.5	PNNL	EPMA	5.8	16.7	3.9	0.17	0.8	11.7	56.4	3.1	0.19	98.6
	Corning	XRF+ICP-OES	6.1	17.2	3.9	0.15	0.8	11.9	56.7	3.3	0.17	100.1
ISG-1.75	PNNL	EPMA	5.8	16.6	3.3	0.15	1.2	12.0	56.8	3.1	0.17	99.1
	Corning	XRF+ICP-OES	6.0	17.4	3.4	0.15	1.1	11.9	56.5	3.3	0.18	100.0

Supplementary Table 3: Measured average densities with one standard deviation for PNNL data.

Glass	Corning Density (g·cm ⁻³)	PNNL He Pycnometry (g·cm ⁻³)
ISG-1	2.508	2.512 ± 0.001
ISG-1.25	2.496	2.497 ± 0.001
ISG-1.5	2.490	2.492 ± 0.001
ISG-1.75	2.486	2.489 ± 0.001
ISG-2	2.475	2.472 ± 0.002

Supplementary Table 4: Measured pH_{90°C} on days 7, 63, and 196 of the static alteration tests. All pH_{90°C} values have an error of ± 0.2.

Glass	Day 7	Day 63	Day 196
ISG-1	9.0	8.9	9.0
ISG-1.25	9.0	8.8	9.0
ISG-1.5	9.0	8.9	9.0
ISG-1.75	9.0	8.9	9.0
ISG-2	9.0	8.8	8.9