Supplementary Materials – Louvel et al.

RBS measurements:

Rutherford Backscattering Spectroscopy (RBS) measurements were collected on the Hpg-Br2 sample at the Department of Physics of ETH Zurich. A 3.5 mm diameter disk of Hpg-Br2 glass mounted in epoxy and carbon-coated was exposed to a 2 MeV ^{4}He ion beam. The concentration of Br in the sample was determined from the energy of the backscattered alpha particles $^{4}He^{2+}$ (Fig. S1).

EMPA measurements:

Concentration of major elements (Si, Al, Na and K) and Br in the NS2 and Hpg glasses were determined by EMPA using a JEOL JXA-8200 microprobe at ETH Zurich An accelerating voltage of 15 keV and a 10 nA beam current were used for major elements, and then tuned to 25 keV and 90 nA for Br analyses. All measurements were conducted with a defocused beam of 30 µm to avoid element migration during the analysis. The probe was calibrated using wollastonite/quartz (Si), corundum (Al), aegirine (Na), K-feldspar (K), and the Hpg2-Br glass (Br). Counting time was set to 40 s for Si, Na, Al, K and 60 s for Br. The signal from Na and Br was carefully monitored during the measurements and found to be stable for these conditions. The homogeneity of the glasses was confirmed by elemental profiles collected in the sample and by the absence of microscopic mineral phases.

LA-ICPMS measurements:

LA-ICPMS analyses of Br were conducted using a 193 nm ArF excimer laser coupled with an ELAN 6100 DRC ICP quadrupole mass spectrometer (Heinrich et al., 2003) and a beam diameter of 40 µm. All analysis were bracketed by measuring an external standard (NIST 610) to allow for linear drift correction, and the average SiO_2 and Br content determined by EMP analysis for the Hpg-Br2 glass was used as an internal standard.

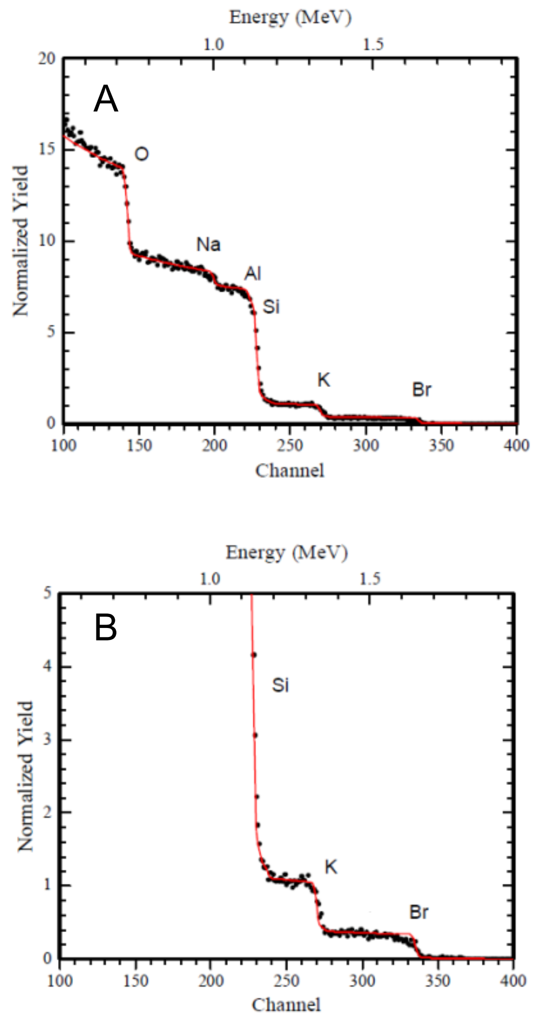

Figure S1. A) 2 MeV Rutherford Backscattering Spectroscopy (RBS) spectrum (dots) of the Hpg-Br2 starting glass. The element labels show the energy/channel value for backscattered alpha-particles ($^{4}He^{2+}$) from each element (namely O, Si, Na, Al, K and Br) on the surface of the sample. With increasing atomic number Z, collision of $^{4}He^{2+}$ will result in smaller energy loss, *i.e.*, heavier elements are on the right of the spectrum. The spectral simulation (line) is calculated for an infinitely thick material having the theoretical composition of the starting material. Good agreement between spectral simulation and RBS spectrum confirms that Br concentrations in the synthetic glass are similar to the Br initial input (0.96 wt%). **B)** Enlarged view of the Br signal.