



**Supplementary Figure 1.** Experimental glasses used in this study treated by the “peak-shift” calibration from Fialin et al. (2011). Glass and olivine FeL $\alpha$  peak shift positions are scaled to that of hematite standard (measured as a reference to avoid machine drift) and expressed as  $\Delta\sin\theta$  versus total Fe concentration. Solid line represents the calibration for pure Fe<sup>2+</sup>, constructed from olivines. Diamonds are experimental glasses used in calibration of Fialin et al. (2011); only the most reduced (filled diamonds) and most oxidized (open diamonds) are shown for clarity. Colored dots are most reduced (green) and oxidized (red) glasses from this study (including some other from Alexander Borisov’s collection). Replicate analyses conducted for both oxidized and reduced glasses demonstrate the poor reproducibility utilizing the static beam stage.