

S1. Synthesis of pre-hydrated glass cylinders

Pre-hydrated glass cylinders close to water saturation were used for transport experiments to avoid significant flux of free fluid into the glass cylinders. This helps to maintain the amount of fluid phase close to the quantity originally added to the capsule and to ensure the reproducibility of our experimental series. Hydrous PEG2-snk and PEG2-src glasses were synthesized with water contents close to water saturation in order to avoid the formation of bubbles. Bartels et al. (2011) determined a solubility of ca. 9 wt % H₂O at 200 MPa for their PEG2 melts. Therefore, the water solubility at 100 MPa was determined in preliminary experiments in this study. PEG2-src powder was loaded together with ca. 9 wt % deionized water into a Pt capsule, which is significantly above the expected water solubility at 100 MPa. The capsule was processed at 1200 °C and 100 MPa in an internally heated pressure vessel (IHPV) for ca. 24 h to homogeneously dissolve the water in the melt. The melt was quenched by switching off the heating power. Free fluid was released upon piercing the capsule, indicating that water saturation was reached within the melt. The water content in PEG2-src was then determined by Karl-Fischer titration (Behrens et al., 1996) to be 6.17 ± 0.09 wt % H₂O at 100 MPa. These values are ca. 1.5–2 wt % higher than values reported for peraluminous rhyolitic melts (e.g. Behrens and Jantos, 2001), in agreement with previous studies showing that F and B increase the solubility of H₂O (Holtz et al., 1993). Hydrous glass cylinders for transport experiments were then produced by tightly loading the respective glass powder and 6 wt % of deionized water into Pt capsules and following the same synthesis procedure at 200 MPa to ensure the complete solution of added H₂O. Before cutting the run products into cylinders of ca. 5 mm length, the resulting glasses were checked for potential weight loss during the experiments. The obtained hydrous glasses were microscopically crystal-free, but contained homogeneously distributed bubbles of ca. 5–7 µm diameter. After synthesis, small glass pieces from both ends of the capsules were prepared as doubly-polished thin sections to investigate their water contents (Sect. 2.3.4).

References

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