

FIGURE S1. Good correlation of the pressure obtained from EDXRD measurements of periclase from the sample (inside the diamond cylinder) to the pressure of the assemblage (outside the diamond cylinder) for temperature ≥ 1000 °C. Symbols in gray point to experiments that were excluded from the data interpretation due to loss of volatiles under high PT .

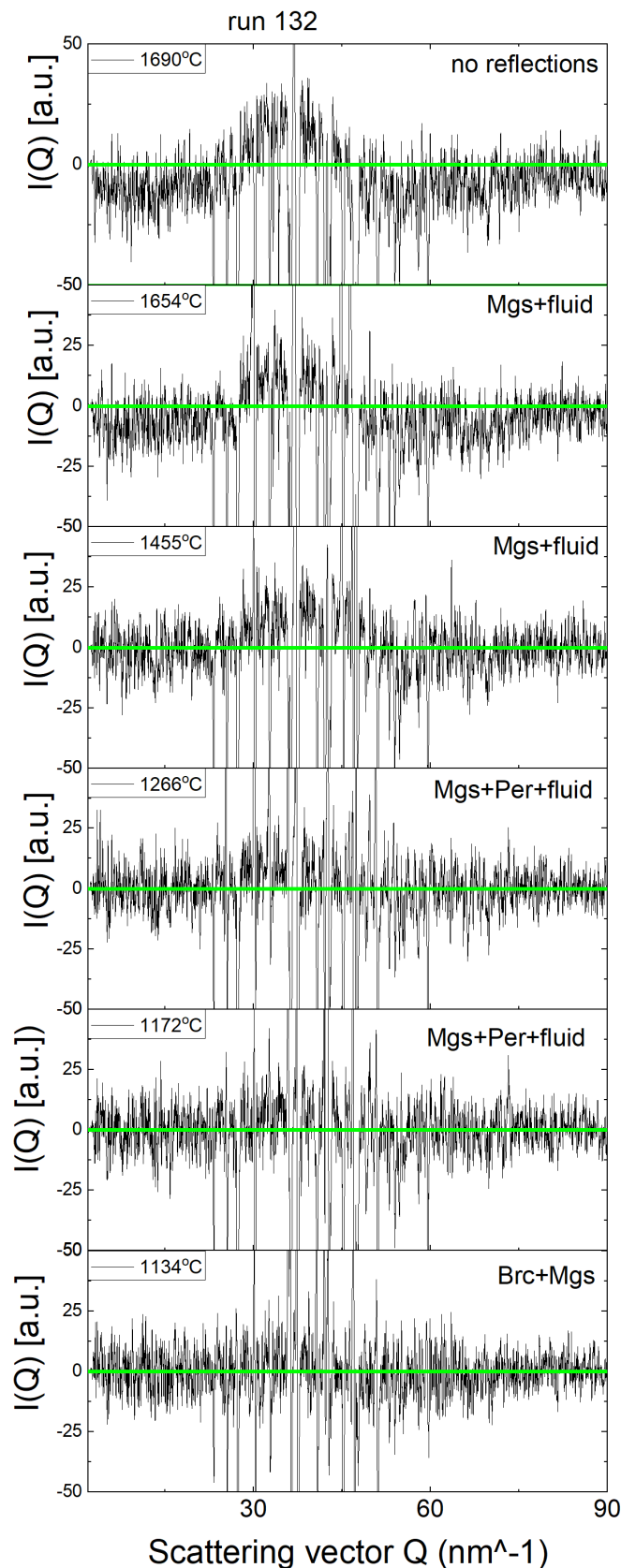


FIGURE S2. These figures show normalized intensities as a function of the scattering vector (Q) for EDXRD measurements of run 132 at different temperatures. The intensities are normalized to a spectrum acquired at high PT of the same experiment where the starting material (magnesite + brucite) was still stable. A weak diffuse scattering signal of the liquid can be seen at 1690 °C. This confirms the presence of melt independent of our main melting criterion (see text). However, the results shown here are not unambiguous, because the experimental design was not optimized for this approach.

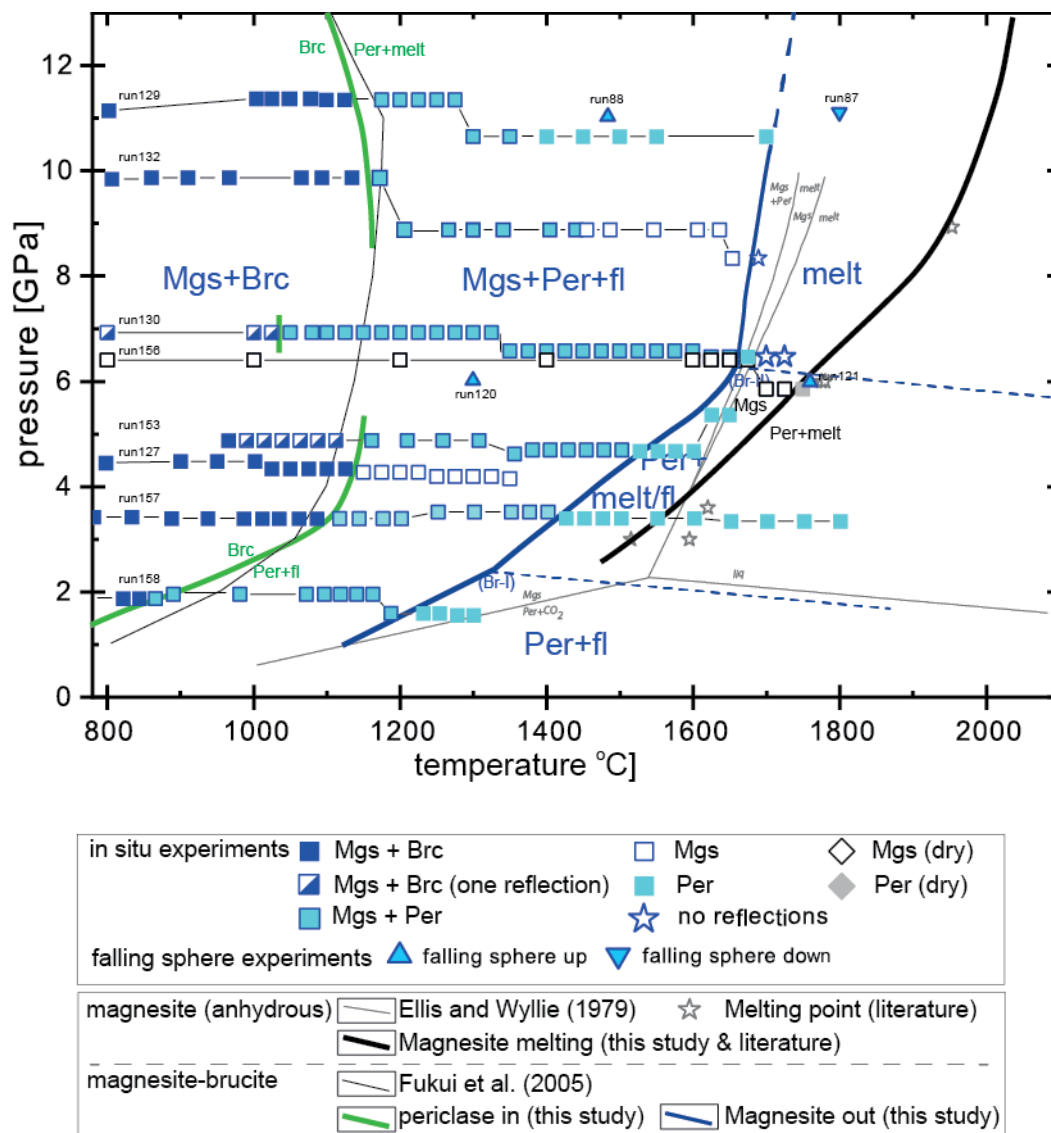


FIGURE S3. For better comparison between the experimental data and our interpretation of phase boundaries, we show here an overlap of panel Figure 4a and 4b from the main manuscript.