



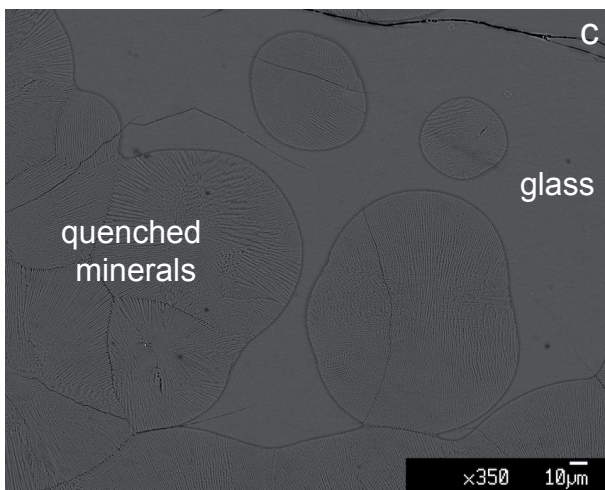
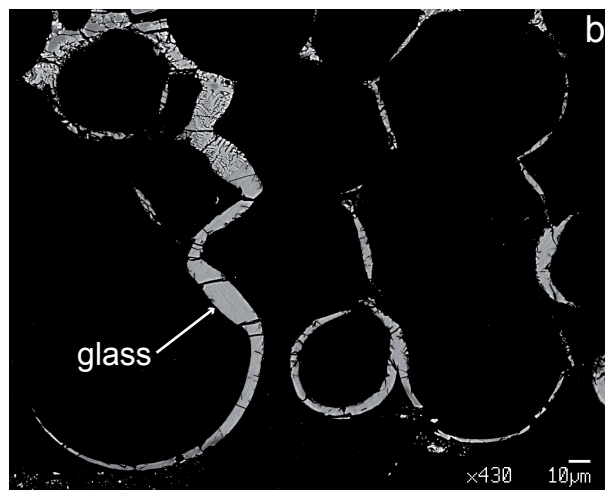
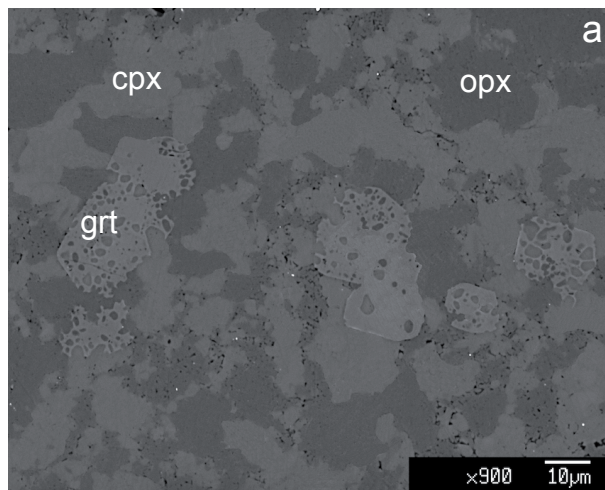
Supplement of

Melting relations of anhydrous olivine-free pyroxenite Px1 at 2 GPa

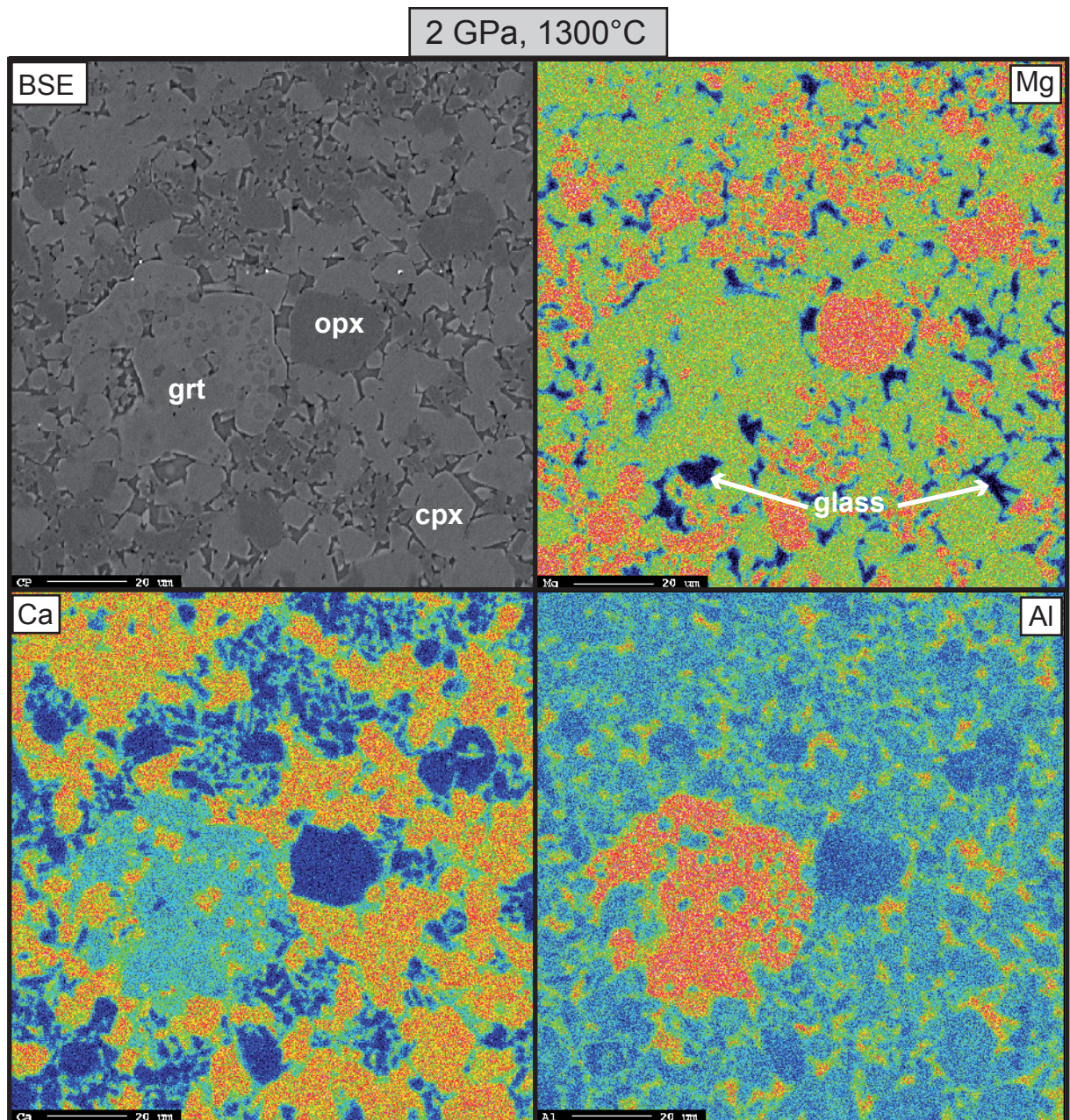
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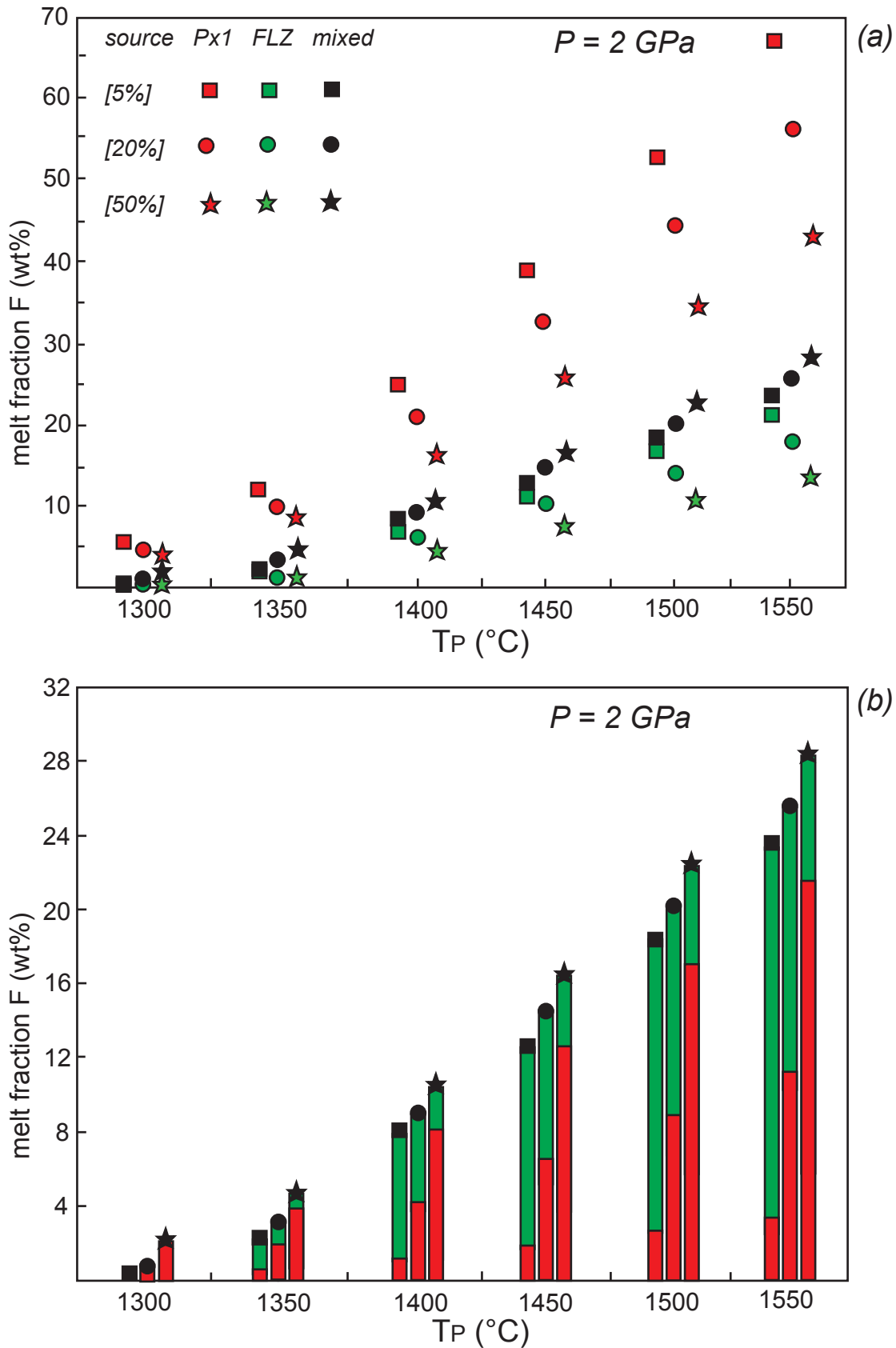
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S1. Back Scattered Images (BSE) showing microstructural features in melting experiments on pyroxenite Px1. **a** Run Px1-9 (2.0 GPa, 1250°C): subsolidus assemblage made by clinopyroxene, orthopyroxene and garnet. **b** Run Px1-5 (2.0 GPa, 1280°C): thin films of glass trapped within carbon spheres layer. **c** Run Px1-8 (2.0 GPa, 1480°C): glass and quenched minerals in completely molten pyroxenite.



S2. Back Scattered Image (BSE) and XRay maps for Mg, Ca and Al of representative texture in run Px1-1 (2.0 GPa, 1300°C).



S3. (a) Melt fractions (wt%) produced at potential temperature (T_P) from 1300 to 1550°C by pyroxenite Px1 and fertile lherzolite FL in a upwelling heterogeneous mantle. Melt fractions were computed using the method of Lambart et al. (2016), assuming heterogeneous mantle sources containing 5, 20 and 50% pyroxenite Px1. The red symbols show the melt fractions in the pyroxenite, the green symbols the melt fractions in the peridotite, and the black symbols represent the total melt fractions produced by the mixed sources. (b) Melt fractions (wt%) produced by mixed sources showing the contribution from pyroxenite and lherzolite (red and green bars, respectively).