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Single crystal growth of wadsleyite

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Abstract

We have synthesized large (0.7–1.0 mm) crystals of anhydrous, water-bearing, and Fe-bearing wadsleyite by means of growth from solution in the thermal gradient field. Nearly anhydrous (<68±4 wt ppm H_2O) Mg_2SiO_4 crystals were grown using $K_2Mg(CO_3)_2$ as a solvent at 16.5 GPa and 1700 °C. $(Mg_{0.92}Fe_{0.08})_2SiO_4$ crystals containing 84±17 wt ppm H_2O were grown using $92K_2Mg(CO_3)_2$-$8FeCl_2$ as a solvent. Crystals of Fe-free wadsleyite with 1496±117 wt ppm H_2O were synthesized at 1400 °C and 15.5 GPa by using $2KHCO_3$-$Mg(OH)_2$ as a solvent.

Keywords: Mg_2SiO_4, wadsleyite, single crystal growth, high pressure, thermal gradient method