Fate of $MgSiO_3$ post-perovskite in super-Earths

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$MgSiO_3$ post-perovskite (ppv) is the final form of $MgSiO_3$ in the Earth. However, what happens in super-Earths in which pressure and temperature are much higher than those of the Earth's lower mantle? Understanding of fate of $MgSiO_3$ ppv under ultrahigh pressures is crucial for nature of interiors of super-Earths. Computational studies so far have predicted several pressure-induced dissociations of $MgSiO_3$ in super-Earths. Recent studies agree that $MgSiO_3$ ppv undergoes three-stage dissociations involving MgO, SiO_2, Mg_2SiO_4, and $MgSi_2O_5$ [1,2]. Based on these studies, we reinvestigate the high PT phase diagram of MgO-SiO2 system and we propose a new phase transition in MgO-SiO_2 system in super-Earths. Clapeyron slope of the new transition and thermodynamic quantities calculated for these phases should provide fundamental information for numerical simulation of mantle dynamics in super-Earths.

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