Melting experiment of lower mantle material

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Melting experiment of peridotite has been carried out up to 33 GPa using a sintered diamond anvil assembly. The first liquidus phase changes from Mw to Mg-Pv at about 31 GPa. At 33 GPa, small amounts of Mw and Ca-Pv are also existent in liquidus. Mass balance regression with respect Mg, Al, Si, Ca, and Fe suggests that pyrolite may be formed by differentiation of 34% Mg-Pv and 3% Ca-Pv from the C1 bulk mantle in a magma ocean deeper than 1000 km. The layer of differentiated perovskites attains a depth of 1500km and would stably lie in the lower half portion of the mantle for a long term because of its high density. High capability of Ca-Pv to accommodate alkaline elements and REE would characterize the layer as an enriched resevoir.