

## **Carbonate melt from subduction zone: the key for Craton destruction**

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The removal of Fe-rich components during the formation of cratonic lithosphere makes it buoyant, refractory and anhydrous, and hence long lived in the earth's history. However, some of the Precambrian cratons, such as the Wyoming craton and North China Craton (NCC), underwent extensive thinning and modification in the Neoproterozoic and Phanerozoic (e.g., Gao et al., 2004). However, there are still significant controversies with respect to the mechanism of destruction. Here we report infiltration experiments of dolomite-melt ( $\text{CaCO}_3:\text{MgCO}_3\sim 1:1$ ) in harzburgite, which demonstrate that carbonatite melts can percolate very quickly along grain boundaries in harzburgite to form porridge-like texture and totally disperse the cratonic lithospheric mantle. We suggested that the carbonate melt from earlier subduction plate (e.g. paleo-pacific plate) is the key for destruction of North China Craton. The destruction of lithospheric mantle can be divided into two steps: (1) the lithospheric mantle was thinned gradually by mantle convection after it is dispersed by carbonatitic melts; (2) delamination of the lower crust along with a comparable thinner lithospheric mantle (about 30~40 km thick) as a whole into the asthenosphere.