

LETTER

Sinoite (Si₂N₂O) shocked at pressures of 28 to 64 GPa

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ABSTRACT

Shock recovery experiments of sinoite (Si₂N₂O) were carried out in a pressure range of 28–64 GPa. Post-shock samples were investigated by optical microscopy, X-ray diffraction, micro Raman spectroscopy, and transmission electron microscopy coupled with energy dispersive X-ray analysis. Sinoite was stable up to ~28 GPa, being partially amorphous at 34 GPa, and almost completely amorphized above 41 GPa. These results are consistent with the observation that sinoite is found in enstatite chondrites classified into shock stage S2, and imply that sinoite may not be a crystallization product from impact melts and that it may be a metamorphic product of high temperatures and relatively low pressure.

Keywords: Sinoite, shock metamorphism, oxynitride, amorphization, high-pressure transition