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Recovery of stishovite-structure at ambient conditions out of shock-generated amorphous silica

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ABSTRACT

We show that bulk amorphous silica recovered from shock-wave experiments on quartz to 57 GPa is not a true glass but rather keeps a large degree of long-range structural information that can be recovered by static cold recompression to 13 GPa. At this pressure, shock-retrieved silica assumes the structure of crystalline stishovite. A minor amount of material recovers the structure of a recently discovered new silica polymorph.

Keywords: Meteorite, shock, phase transition, amorphous to solid, XRD data, stishovite, high pressure