spectroscopy revealed the occurrence of one zoned zircon-reidite grain among them. This grain is associated with an aphanitic <1 mm-size clast with a partly melted (shock stage III-IV, >45 GPa) appearance. In the zircon-reidite grain, electron microprobe data and Raman spectroscopy indicate an outer domain that is disordered and non-stoichiometric. This outer domain has a texture of radiating acicular crystals (0.5–2.0 µm long) oriented inward from the outer rim. These "spongy" textures are similar to those seen in zircon crystals that have decomposed to ZrO_2 and SiO_2 components. HfO_2 concentrations in this domain appear mostly uniform, while ZrO_2 and SiO_2 and trace elements exhibit strong concentration excursions.

These observations will be compared with zircon-reidite grains from an additional sample that contains zircon-reidite grains. The textures in these zircon-reidite grains will allow me to further evaluate this recently discovered natural polymorphic transition and how it relates to shock intensity during hypervelocity impact.

Characterization of shock metamorphosed $ZrSiO_4$ in the Chesapeake Bay impact crater

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The 80–95 km diameter Chesapeake Bay impact structure (CBIS) formed in the late Eocene on the continental margin of what is now Virginia, U.S.A. The marine impact involved a target with a water depth of 0–340 m above 400–1500 m of unconsolidated siliciclastic sediments overlying a Neoproterozoic crystalline basement. A 1.76 km deep scientific drilling in the annular moat of the crater, ~9 km from its centre recovered a unique section of well preserved impactites, including rare high pressure mineral polymorphs.

High-pressure polymorphs generated in impact events as a result of the interaction of materials with the shock wave can provide constraints for shock pressures and post-shock temperatures. Zircon has the potential to be especially useful because it is refractory, and can be used for dating. Its high-pressure polymorph reidite was synthesized and found naturally in the distal ejecta from the CBIS, and subsequently in the Ries crater in Germany. The zircon-reidite transition has been studied with shock experiments, but Chesapeake Bay offers the rare opportunity to study its natural occurrence.

A detailed shock petrographic study on a polymict impact breccia sample from a depth of 1481.37 m in the Eyreville drilling was completed. Each of the clasts >1 mm in size was assigned a shock stage based on indicative shock pressure features in its associated rock-forming minerals. Some 69% indicate shock stage IA (~10–20 GPa), while 28% are unshocked and 3% were not determined.

Twenty-seven $ZrSiO_4$ grains were identified and Raman

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