

LITHOLOGICAL, PETROGRAPHICAL, AND GEOCHEMICAL INVESTIGATIONS OF SUEVITE FROM THE EYREVILLE CORE, CHESAPEAKE BAY IMPACT STRUCTURE

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The Chesapeake Bay impact structure was drilled in 2005 as a project of the International Continental Scientific Drilling Program (ICDP) and the US Geological Survey. Two stacked drillcores (Eyreville A, B), intersecting the entire crater fill, were recovered within the central zone of the structure. The crater fill comprises sediment clast breccia and sedimentary megablocks (i.e., resurge breccias), a granitic and an amphibolitic megablock, gravelly sand, suevitic breccias, and granites/pegmatites and mica schists. Suevites occur between 1393 and ca. 1550 m depth and also in the form of dikes in the unit of schists and pegmatites (so-called "basement" rocks). The suevites have a grayish, fine-grained clastic matrix and consist of a variety of rock and mineral clasts, as well as secondary minerals (e.g., phyllosilicates). Lithic fragments, angular to sub-rounded, have a variety of sizes (from a few μm to >5 cm) and consist of metamorphosed sedimentary rocks (siltstone, mudstone, sandstone, and greywacke), schist, shale, phyllite and granite. Furthermore, there are different kinds of melt particles (more details in a companion abstract), quartz clasts with PDFs, feldspar with fractures (shock related?) and more rarely feldspar clasts with PDFs, unshocked quartz and feldspar, mica clasts, opaque minerals, and rare diaplectic quartz glass clasts. Many of the quartz grains display PFs (1 \gg 2 sets) and PDFs (1, 2, and rarely more sets per grain; some sets are decorated) and frequently have toasted appearance. Ballen quartz is occasionally noted. The proportions of metasedimentary clasts, clasts of basement rocks, and melt particles vary significantly through the suevite section. The suevite samples show a decrease in the content of SiO_2 combined with a slight increase of the abundances of TiO_2 , Al_2O_3 , Fe_2O_3 , and Lol with depth. Concentrations of siderophile elements are similar to normal crustal contents. Abundant melt particles in suevite indicate pressures higher than 45 GPa. Unambiguously, post-impact alteration (hydrothermal alteration?) has affected the suevite (as indicated by the presence of secondary calcite and phyllosilicate minerals).

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