2007 GSA Denver Annual Meeting (28–31 October 2007)

Paper No. 116-10

Presentation Time: 1:30 PM-5:30 PM

INVESTIGATIONS OF MELT PARTICLES IN SUEVITE FROM THE EYREVILLE B CORE, CHESAPEAKE BAY IMPACT STRUCTURE

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Suevitic breccia (polymict, melt-bearing impact breccia) was found at the very bottom of the 2004 drill hole at Cape Charles at the center of the Chesapeake Bay impact structure. In 2005, a thicker suevite section was recovered in the ICDP-USGS Eyreville deep drillcore, within the deep crater moat, a few km to the north of the Cape Charles drill site. The suevitic breccia unit occurs between 1393 and 1550 m depth. The breccia consists of a variety of rock (metamorphosed sedimentary rocks, schist, shale, phyllite, and granite) and mineral (mostly quartz, feldspar, mica, and opaque minerals) clasts and melt particles embedded in a fine-grained clastic matrix (see our companion abstract). The estimated proportion of matrix (material <0.5 mm) varies from about 10 to 70 volume% in our suevite samples. Melt particles are an integral component of the suevite sequence, also in suevitic dikes in the basement section (Reimold et al., this meeting), and, rarely in the Exmore breccia. The purpose of this work was first to identify the different melt particles that occur in suevite samples, to characterize the different compositions, to determine the precursors (individual target lithologies and/or mixtures of different rock types), temperatures involved, and to investigate the timing of formation during the impact processes. The content of melt varies through the suevite unit on a microscopic scale from a few small melt particles in thin section to a dominant melt component (up to about 60 vol %). In some melt-rich samples the melt particles interfinger and form a structure similar to a welded tuff. Melt fragments are most abundant near the top of the suevitic unit (1400-1420 m) and around 1450 m. Millimeter- to centimeter-sized melt particles (up to >4 cm in size) are frequently ovoid to amoeboidal in shape. Most particles belong to three types that can be distinguished on the basis of color and microtexture: (1) clear, brownish, and greenish glass, often with flow structures (dark and light colored schlieren); (2) brown melt, completely altered to finest-grained phyllosilicate minerals (and occasionally microcrystalline carbonates), sometimes with flow structures; and (3) melt with intersertal texture, with feldspar microlites and tiny opaque crystallites. Scanning electron microscope and microprobe analyses of the various types of melt particles are in progress.

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General Information for this Meeting

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