

# Melt Particles from the Impact Breccia Section, Eyreville B Drill Core, Chesapeake Bay Impact Structure, USA

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The Chesapeake Bay impact structure, 35.5 Ma old and 85 km in diameter, was drilled in the central part at Eyreville in 2005-2006 by ICDP (International Continental Scientific Drilling Program) and USGS (United States Geological Survey). Suevite (a polymict, melt-bearing impact breccia) occurs in the impact breccia section (1397-1551 m) in the Eyreville drill core. Melt is most abundant in the upper part of the impact breccia section and the suevite grades to impact melt rock in the intervals 1402-1407.5 and 1450.2-1451.2 m. Below 1474 m the content of melt is low (less than ~12 vol%) and decreases with depth. Millimeter- to centimeter-sized melt particles (some >4 cm in size) are frequently ovoid to amoeboid in shape and show flow structures. Five different types of melt particles have been recognized: clear colorless to brownish glass, melt altered to finest-grained phyllosilicate minerals, recrystallized silica melt, melt with intersertal texture, and dark brown melt. Most of the melt particles are altered. Particles of the clear unaltered glass, some with shard-like shapes, occur in the upper part of the impact breccia, mostly around 1415 m. The melt with intersertal texture occurs mainly as matrix of the impact melt rock and only rarely as melt particles. The chemical composition of melt particles was determined by SEM-EDX and it was found that the petrographically different types of melt particles have distinct chemical composition. The composition of the melt particles was subjected to HMX mixing calculations. Melt particles can be better modeled as mixtures of major rock forming minerals (quartz, mica, feldspar) than as mixtures of the target lithologies. This suggests that the melt particles originated from local melting of rocks rather than from a large mixed melt pool. The original composition of especially the altered melt particles could have been modified by hydrothermal alteration.