MELT IN THE IMPACT BRECCIAS FROM THE EYREVILLE DRILL CORE, CHESAPEAKE BAY IMPACT STRUCTURE – MICROPROBE ANALYSES. K. Bartosova[1], L. Hecht[2], P. Czaja[2], E. Libowitzky[3], and C. Koeberl[1]. [1]Department of Lithospheric Research, University of Vienna, Althanstrasse 14, A-1090 Vienna, Austria. E-mail: katerina.bartosova@univie.ac.at. [2]Museum für Naturkunde, Leibniz-Institute at Humboldt University Berlin, Invalidenstrasse 43, 10115 Berlin, Germany. [3]Institute for Mineralogy and Crystallography, University of Vienna, Althanstrasse 14, A-1090 Vienna, Austria.

Introduction: The 35 Ma and 85 km diameter Chesapeake Bay impact structure was drilled in its central part at Eyreville in 2005-2006 in an ICDP-USGS drilling project [1]. The Eyreville drill core comprises (from top to bottom) post-impact sediments, sediment clast breccias and sedimentary megablocks (the so-called Exmore breccia beds), a large granitic and a small amphibolitic megablock, gravelly sand, impact breccia, and granites/pegmatites and mica schists [1]. The interval of impact breccias (1397-1551 m) consists mostly of suevite and contains abundant melt particles (millimeter- to centimeter-sized), especially in the upper part, where also two intervals of impact melt rocks (~1 and 5.5 m thick) occur [2].

Results: We have studied the melt particles by means of optical microscope, electron microprobe, SEM, and Raman spectrometer. Several major types of melt have been distinguished on the basis of color, micro-texture, and mineralogical and chemical composition. In the suevite, four main types of melt particles have been distinguished: m1 - clear, brownish, or greenish, only slightly altered glass, commonly with flow texture; m2 - brown melt, entirely altered to fine-grained phyllosilicate minerals; m3 - recrystallized silica melt; and m5 - dark brown melt (of shale precursor). Other types of melt have been found within the impact melt rocks: m4 – with feldspar and/or pyroxene microlites; m6 – heterogeneous silica-rich melt with dark–brown globules; and m7 – brownish altered melt with globular and worm-like textures. Also transitional or mixed melt types, especially in the impact melt rocks, but also between the types m1/m2 and m2/m3 in the suevites were noted. The melt particles have commonly heterogeneous texture and composition, are altered and porous. The shape of the melt particles is mostly amoeboid, some particles of type m1 are shard-like. There are many features such as schlieren, cracks and vesicles – with secondary rims and filling, undigested clasts and crystallites. Several melt particles of each type were analyzed and elemental maps were obtained for the most interesting melt parts to further characterize the chemical relations between different phases. The composition of the melt varies from nearly pure SiO_2 (m3) to various silicate composition; carbonate is very rare and is probably secondary. Raman spectrometry helped to identify grains and crystals in the melt. The undigested grains are mostly quartz or rare feldspar. Pyrite, graphite, and rutile also occur. Crystals that probably newly formed during cooling or alteration of the melt include abundant small anatase and rare apatite. No high-pressure phases have been identified.

References: [1] Gohn G. S. et al. 2006. *EOS* 87, 349 & 355. [2] Horton J. W. et al. 2009. (Geologic column) in: *GSA Special Paper (Chesapeake Bay Drilling Project volume)*, in press.