SOME PROPERTIES OF AN UNUSUAL GLASS AND CARBONATE IN THE D'ORBIGNY ANGRITE. A. Kubny[1], A. Banerjee[2], E. Jagoutz[1], M. E. Varela[3], F. Brandstaetter[4] and G. Kurat[4], [1]Max-Planck-Institut f. Chemie, Postfach 3060, D-55020 Mainz, Germany, [2]Institut f. Geowissenschaften-Mineralogie, Johannes Gutenberg-Universität, D-55099 Mainz, Germany, [3]CONICET-UNS, Dpto de Geología, San Juan 670 (8000) Bahía Blanca, Argentina, [4]Naturhistorisches Museum, Postfach 417, A-1014, Vienna, Austria; kubny@mpch-mainz.mpg.de

Introduction: The angrite D'Orbigny is unusually rich in glass as compared to other members of the angrite group [1, 2]. The most common glass fills open spaces in druses and hollow shells. Carbonate fills in part the abundant open spaces. Inside hollow shells, in the center of the rocks, it forms crystal bushels and is white. In contrast, near the surface of the meteorite, it forms crusts and has an ochre color.

Analytical Methods and Results: Glass in some of the abundant open spaces in D'Orbigny, druses and hollow shells, is black (brown in thin section), is rich in schlieren and contains variable amounts of bubbles, mineral fragments and sulfide beads [1, 2]. Its chemical composition is similar to that of the bulk rock for major, minor and trace elements [1-3]. The major element contents of the glass in the D'Orbigny angrite were determined by electron microprobe analysis [2]: SiO_2 (38.4 wt%), TiO_2 (2.54 wt%), Al_2O_3 (8.1 wt%), Cr_2O_3 (0.09 wt%), FeO (25.8 wt%), MnO (0.32 wt%), MgO (4.20 wt%), CaO (20.4 wt%). The glass easily dissolves in part in aqua regia producing a clear yellow solution, a white porous residue, and relict minerals. The white and porous leach residue preserved the shape of the original glass sample and consists mainly of SiO_2 (93 wt%) with low contents of TiO_2 (~1 wt%), Al_2O_3 (3-4 wt%) and FeO (0.5-1.5 wt%), as determined by electron microprobe analysis. The determination of the ion concentrations of the solution also shows that all major elements, except Si and Ti were dissolved. The relict minerals olivine and spinel which are embedded in the white porous residue could be observed by Micro-Raman spectroscopy. In contrast to the reaction of the D'Orbigny glass with aqua regia giving a residue, treating with 25% aqueous HCl produces a yellow solution which forms a yellow gel within some days.

The Micro-Raman spectrum of the D'Orbigny glass shows the typical spectral features of an aluminosilicate glass with broad bands which can be attributed to stretching modes of oxygen atoms (930 cm^{-1} , s br), intertetrahedral deformation modes (714 cm^{-1} , w br) and bending modes of oxygen atoms (573 cm^{-1} , w br). The glass appears to consist primarily of the coexisting anionic species SiO_4^{4-} , SiO_3^{2-} , and $Si_2O_5^{2-}$. The D'Orbigny glass occasionally contains rounded minerals of which iron sulfides and obviously diamonds could be identified by Micro-Raman spectroscopy. A contamination with diamonds is very unlikely but can not be yet excluded entirely.

The Micro-Raman spectrum of the white leach residue of the glass shows bands which can be attributed to amorphous silica structured of four-membered siloxane rings of SiO_4 tetrahedra.

The structure of the carbonate could be determined by Micro-Raman spectroscopy. The white bushels show the spectral features of pure calcite whereas the ochre crust exhibits Raman bands of disturbed calcite which are almost completely hidden by the highly fluorescent background.

References: [1] Kurat G. et al. (2001) *LPS XXXII*, 1737.pdf. [2] Varela M. E. et al. (2001) *LPS XXXII,* 1803.pdf. [3] Varela M. E. et al. (2001) *Meteorit. Planet. Sci., 36*, A201.