

## **Impact-related melting of sedimentary target rocks of the Rubielos de la Cériida structure in Spain**

Schüssler, U., Hradil, K., Ernstson, K.  
Institut für Mineralogie, Universität Würzburg.  
e-mail: uli.schuessler@mail.uni-wuerzburg.de

The Rubielos de la Cériida structure is located in northeastern Spain south of Zaragoza. Neighbouring the Azuara impact structure and being of the same stratigraphic age, it is interpreted as one part of a doublet impact structure, caused by a paired projectile during the Lower to Mid-Tertiary [1, 2,]. Within the structure, various kinds of melted rocks form blocks of variable size in a decimetre to metre range, intermixed in a polymict megabreccia.

A porous and soft silicate melt rock is composed of >90% glass. This is typically shown by an amorphous “glass hump” (XRD). The chemical composition is SiO<sub>2</sub> around 58 wt.%, variable Al<sub>2</sub>O<sub>3</sub> up to 21%, MgO 5-6%, CaO 1.5%, variable Na<sub>2</sub>O+K<sub>2</sub>O around 2%, LOI around 10%. This roughly fits the average composition of shales which are assumed to be the pre-impact educt rocks.

A special kind of former melt consists of amoeba-like calcite particles, embedded within a glassy matrix. The calcite bodies are coarse-grained in their centres, with decreasing grain size and perpendicular orientation towards the rims. The isotropic glassy matrix consists of nearly pure Ca-phosphate and is pervaded by tiny microcrystals of very imperfectly recrystallized apatite (XRD). A similar melt rock has been reported for the suevite of the Ries crater [3]. In the suevite, the calcite particles with identical structure and composition are interpreted as quench products of a carbonate melt [3]. Different from the Rubielos melt rocks, the matrix in the Ries samples is silicate glass as a result of immiscibility of carbonate melt and silicate melt [3]. In our case, the melt rock displays a small-scaled immiscibility of coexisting former carbonate melt and phosphate melt.

The composition of the various melt rocks displays the composition of the pre-impact stratigraphy of the target region which is dominated by carbonates with interlayers of shales. Phosphate-rich material can be deduced from coprolite layers well known within sediments of the regional Lower Tertiary.

**References:** [1] Ernstson, K. et al., 1985, EPSL, 74, 361-370. [2] Ernstson, K., Fiebag, J., 1992, Geol. Rdsch., 81, 403-427. [3] Graup, G., 1999, Meteoritics Planet. Sci, 34, 425-438.