

BALLEN QUARTZ, AN IMPACT SIGNATURE: NEW OCCURRENCE IN IMPACT MELT BRECCIA AT ROCHECHOUART-CHASSENON IMPACT STRUCTURE, FRANCE.

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The 214 ± 8 Ma old Rochechouart-Chassenon impact structure [1], about 25 km in diameter, has been known for about forty years. Rocks there display a wide variety of shock-metamorphic effects, including shatter cones, planar features in quartz grains, isotropization of feldspar, kink-banding in muscovite and biotite, melt particles, diaplectic quartz glass, and impact-melt unit [e.g., 2]. The presence of ballen quartz in impact breccia samples from the Rochechouart-Chassenon structure has not been mentioned in earlier publications. Here, we note the presence of ballen quartz (Fig. 1) in impact melt breccia from Babaudus and discuss implications for pressure and temperature of the breccia formation. The formation mechanism of ballen quartz is still unresolved [3-4] and this new discovery can be added to the some other impact structures for which ballen quartz is known.

Babaudus breccia is a vesicular impact melt rock, which consists of feldspar and pyroxene laths in a matrix of devitrified glass. Rare clasts of shocked quartz and feldspar occur and a few recrystallized quartz show the ballen texture (Fig. 1). Ballen frequently display different optical orientation and also some ballen with intragranular polycrystallinity occur (heterogeneous extinction within single ballens). Most of the ballen are oval in shape and are about 15 to 90 μm in long dimension.

The identification of ballen quartz with different optical orientation and intragranular polycrystallinity provide some constraints on the pressure (>50 GPa) and temperature (>1200 °C) conditions for the formation of the Babaudus breccia and/or post-impact alteration processes that have affected the breccia.

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References: [1] Kelley, S. P. and Spray, J. G. 1997. *MAPS* 32:629-636. [2] Kraut, F. and French, B. V. 1971. *JGR* 76:5407-5413. [3] Carstens, H. 1975. *Contrib. Mineral. Petrol.* 50:145-155. [4] Bischoff, A. and Stöffler, D. 1984. *JGR Suppl.* 89:645-656.

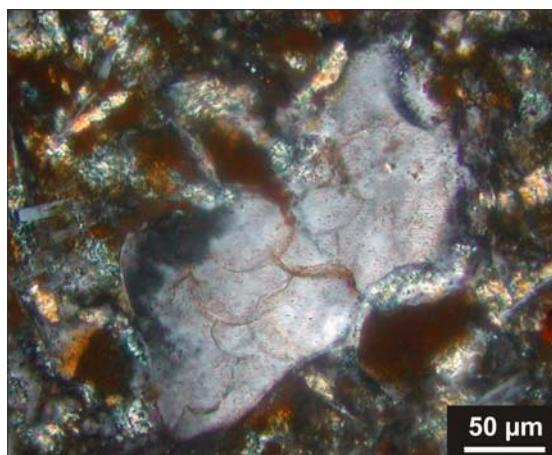


Fig. 1: Thin section microphotograph (plane-polarized light) of ballen quartz in Babaudus breccia from Rochechouart-Chassenon impact crater.