

CATHODOLUMINESCENCE PROPERTIES OF ST MARY'S COUNTY, A TYPE 3.3 ORDINARY CHONDRITE, COMPARED WITH OTHER TYPE 3 ORDINARY CHONDRITES
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The type 3 ordinary chondrites have experienced a considerable range of secondary alteration. It is clear that from 3.3 to 3.9, thermal metamorphism has been the major secondary process, but the lower types may have also suffered aqueous alteration [1,2]. The most "primitive" ordinary chondrites should be those which have experienced least metamorphism and least aqueous alteration. In this case, it is at least arguable that the 3.3 ordinary chondrites should be the materials most closely resembling the primary nebular materials. St Mary's County meteorite is an important ordinary chondrite in this connection, since its TL measurements indicate that it is type 3.3. However, it has received little attention, the only publication dealing specifically with this meteorite is the description by Noonan et al. [4]. We have carried out a study of the CL petrography of St Mary's County and compared it with similar studies of other type 3 ordinary chondrites.

Our previous work has shown that the cathodoluminescence (CL) properties of type 3 ordinary chondrites vary systematically with the degree of metamorphism experienced [5-7]. St Mary's County share a lot of properties in terms of luminescent materials and variety of luminescent colors with the previously studied primitive type 3 chondrites, but also have important differences in both numbers and type of luminescing materials. They all have relatively low level CL, and the matrix in St. Mary's is comparable to the matrix in Krymka, which is virtually nonluminescent. The luminescent types of mesostases appear to be intermediate between the most primitive (i.e. Semarkona and Krymka) and the intermediate categories of petrologic subtype. 61.3% of the chondrules emit blue luminescence, 16% emit dull red/purple light and 18% are nonluminescent. The olivine composition data of ref.4 are also consistent with St Mary's County being intermediate between Krymka (3.1) and ALHA77214 (3.4). Other luminescent types are observed, but are only minor in their mode of occurrence (dull blue 3.3% and yellow 1.3%). St. Mary's County also possess a particular chondrule association only previously observed in Chainpur [5]. These chondrules have very large red luminescing grains rimming chondrules with bright blue luminescing mesostases and other more interior grains that are nonluminescent. These are not observed type 3 ordinary chondrites of lower or higher petrologic types.

St Mary's County therefore has all the CL and TL properties expected for a type 3.3 ordinary chondrite. It is hoped that this will provide further insight into mineralogic and petrologic changes accompanying very low levels of metamorphism and of any possible role aqueous alteration may have played in their history.

References: 1. Hutchison et al, (1987) G.C.A. 51: 1875-1882. 2. Guiman et al, (1987) G.C.A. in press. 3. Sears et al, (1988) in "Meteorites and the Early Solar System", J.F. Kerridge and M.S. Mathews (ed.), Univ. of Ariz., (1988), 3-31. 4. Noonan et al, (1977), Smithson. Contrib. Earth Sci., No.19, 96-103. 5. DeHart et al, (1987) L.P.S. XVIII, 225-226. 6. DeHart et al, (1988) L.P.S. XIX, 259-256. 7. DeHart et al, (1989) G.C.A. submitted.

Support: NASA grant NAG 9-81