

**Thermoluminescence of individual clasts and matrix from basaltic achondrites.** J. David Batchelor and Derek W. G. Sears. Cosmochemistry Group, Department of Chemistry and Biochemistry, University of Arkansas, Fayetteville, AR 72701, USA.

*Introduction.* Thermoluminescence (TL) measurements enable new insight into metamorphic, shock and brecciation histories of basaltic achondrites (Batchelor and Sears, 1989, 1990). The last sustained high temperature of most of these meteorites was  $\leq 800$  °C, and burial depths of  $> 350$  m would be needed for equilibration of pyroxenes. LEW85300 and the paired fragments have been shock heated to  $\geq 1000$  °C. TL sensitivities reflect the amount of eucritic material in howardites (diogenitic material having very low TL sensitivity), and equilibrated eucrites have TL sensitivities about 8 times higher than those of unequilibrated eucrites, due to metamorphism.

*Bholghati.* Seven splits of the Bholghati howardite showed TL properties that almost bracketed the range observed for whole-rock samples of howardites, the TL sensitivity varying by an order of magnitude between eucritic clasts and dark matrix material. (Only one whole-rock sample, the diogenitic howardite LEW85313, lay outside this range.) The TL data reflect the brecciated nature of the matrix, and there is no evidence for a post-brecciation overprint.

*EET87509-group Howardites.* EET87509, EET87531, and EET87513 are paired, and contain a wide variety of clasts; EET87509 contains rapidly cooled pigeonite vitrophyres and volcanic glasses, EET87513 contains magnesian eucritic clasts and a CM clast, EET87531 contains both equilibrated and unequilibrated eucritic clasts (Buchanan and Reid, 1990). We are currently acquiring TL data for 2–3 matrix samples from each meteorite, and for the following clasts: EET87513, eucrite, recrystallized eucrite, recrystallized and deformed eucrite, recrystallized diogenite; EET87531, unequilibrated eucrite, equilibrated eucrite, partially recrystallized eucrite; EET87509, porphyritic eucrite with zoned plagioclase phenocrysts, pigeonite vitrophyre with partly skeletal phenocrysts.

*LEW85300-group Polymict Eucrites.* LEW85300, 302, and 303, and LEW88005, a newly discovered member of this group, have large clasts, and a complex shock/brecciation history involving temperatures  $\geq 1000$  °C (Batchelor and Sears, 1989, 1990) and show Ar-Ar datable events at 3.5 and 1.6 Ga (Bogard and Garrison, 1989; Nyquist and Bogard, 1990). According to Hewins (1990), the plagioclase in these meteorites is in diverse forms; normal feldspar, maskelynite, and veins of dark glass. TL data are being obtained for several clasts and matrix samples from each meteorite. References: Batchelor and Sears (1989) *Meteoritics* **24**, 250. Batchelor and Sears (1990) *LPS* **21**, 54–55. Bogard and Garrison (1989) *LPS* **20**, 17–18. Buchanan (1990) *LPS* **21**, 141–142. Hewins (1990) *LPS* **21**, 509–510. Nyquist (1990) *LPS* **21**, 903–904.