VOLATILE/MOBILE TRACE ELEMENTS IN THE BHOLGHATI HOWARDITE, R. L. Paul, M. S. Wang and M. E. Lipschutz, Dept. of Chemistry, Purdue Univ., W. Lafayette, IN 47907.

The major element contents and refractory trace element concentrations in howardites (H) demonstrate that these meteorites are mixtures of eucritic (E) and diogenitic (D) end-members [1]. Recent RNAA (radiochemical neutron activation analysis) determinations of volatile/mobile (or labile) trace elements in HED meteorites [2,3] indicate the presence of a late admixture of another component of highly variable composition, identified with condensed volcanic emanations.

Meteorites classified as howardites are very rare although the eucrite-howardite distribution is continuous [3]. Very little is known about trace element contents - particularly labile ones - in constituent clasts of howardites. Through the courtesy of the Geological Survey of India, Dr. J. C. Laul obtained 10 g of the Bholghati howardite fall and organized a consortium to study it. We were invited to join this Consortium to determine Ag, Au, Bi, Cd, Co, Cs, Ga, In, Rb, Se, Te, Tl, U and Zn by RNAA - elements known from our previous studies of HED meteorites to yield important genetic information [2,3].

Samples analyzed included 3 matrix samples (BH-11, 158 mg; BH-24, 113 mg; BH-25, 125 mg) from different regions of the meteorite, each of which had been pulverized for Consortium studies. We also received samples chipped from 3 clasts: an unusual dark clast containing substantial FeS (BH-1, 2.84 mg) and 2 white ones (BH-2B, 12.08 mg; BH-5A, 22.26 mg). Clast BH-5A visually appeared to be eucritic.

At present, analyses of the clasts are in progress. The 3 matrix samples are quite inhomogeneous with BH-11 being generally the most trace element-rich. It contains at least a factor of 2 more Ag, Au, Cd, Tl and Zn than do the other samples. BH-24 contains somewhat more U and less than half of the Tl than in the others. Except for Tl, BH-25 is the most trace element-deficient.

As expected, U contents parallel those of rare earth elements, REE [4]: there is otherwise no relationship between REE and other trace elements we determined, in keeping with our conclusion that HED meteorites include a trace element-rich component of highly variable composition [2,3]. Bholghati matrix samples contain higher trace element contents than do most HED meteorites but concentrations even in BH-11 are exceeded by those in other HED samples [2,3]. On a Tl/U vs. Tl plot, the 3 Bholghati matrix samples lie close to the trend line defined by nearly all eucrites. This argues either that little solid/liquid fractionation occurred during matrix formation from magma or that solid/liquid fractionation and vapor transport occurred in such a manner as to allow Bholghati matrix to remain near the eucrite trend line. Data for the white clasts, which should shortly be available, will permit a choice between these alternatives.

REFERENCES

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