

COMPOSITIONAL VARIATIONS AMONG WHOLE-ROCK FRAGMENTS OF THE L6 CHONDRITE BRUDERHEIM

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ABSTRACT

Twenty ~100 mg random fragments of the Bruderheim chondrite were analyzed by INAA to determine extents of heterogeneity and to check earlier results that gave anomalous LREE concentrations. Considerable compositional heterogeneity was observed in both concentrations (maximum/minimum of 1.7 for Ir, 1.8 for Na, 6.8 for La, 7.4 for Co) and concentration ratios (>3x for Ni/Co and La/Eu). Compositions could be modelled quantitatively in terms of end-member components of constant composition representing the minerals olivine + orthopyroxene, clinopyroxene, plagioclase, kamacite, taenite, troilite, chromite, and phosphate. The model yields the proportions of minerals in each sample as well as the meteorite as a whole; accurate determination of the end members depends on high intrasample precision for many elements. No evidence of compositional heterogeneity of end members for trace elements was found. It is shown that these analyses, which used only ~2 grams of the meteorite, are equivalent in accuracy to a single sample of several tens of grams, and that knowledge of the extent of heterogeneity is essential to knowing the quality of sampling as well as for comparing results from one analysis with another and of one meteorite with another.