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Study of the primitive achondrites Acapulco, Tafassasset and Northwest Africa 3250.

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We compared the mineralogy and petrology of NWA 3250 and Tafassasset to Acapulco. All meteorites have affinities to primitive achondrites and the first two are linked to CR chondrites, as based on O isotopic compositions. Olivine, pyroxene and phosphates were studied using a petrographic microscope, SEM and EPMA. Modal abundances were obtained from element distribution maps.

In all three meteorites olivine and low-Ca-pyroxene are dominant phases. Merrillite was observed in all samples; apatite is limited to Acapulco. Except for Fe concentration, the composition of merrillite is similar in all meteorites. The analyses of apatite resulted in systematically higher concentrations of F, and lower of Cl than reported previously [1].

Furthermore the degree of equilibration and oxidation were investigated. Equilibration increases in the sequence: NWA 3250, Tafassasset and Acapulco, while Acapulco is the most reduced and NWA 3250 the most oxidised of these meteorites.

The results imply that NWA 3250 and Tafassasset should not be classified as CR chondrites, and that both originate from two distinct parent bodies.

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[1] Min, K. et al. (2003) EPSL 209, 323–336.

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