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Neutron Diffraction Studies on Pyrochlores ADRIAN LOSKO, New Mexico State University / Los Alamos National Laboratory, SVEN VOGEL, MAULIK PATEL, JAMES RYNE, Los Alamos National Laboratory — Pyrochlore structures R2Ti2O7 (with R being a rare earth element) belong to the Fd-3m space group and the family of rare earth titanates. Recently, pyrochlores have attracted great attention as nuclear waste form and possible high temperature solid oxide fuel cell (SOFC) materials. Furthermore, Dy2Ti2O7 was reported by several authors to be the first structure in which magnetic monopoles were observed. This latter observation is related to the existence of spin ice in these structures, a phenomenon referring to a geometrical frustrated magnetic system, whereby "frustration" describes the effects that occur when interactions of similar strength compete and prevent a system from settling into a unique ground state. In spin ices, like Dy2Ti2O7, only the rare-earth atoms have a magnetic moment and these cations reside in a network of corner sharing tetrahedra forming the pyrochlore lattice. Here we present structural parameters such as cation ordering and bond lengths to characterize the crystal structure over a temperature range from ∼5K to 1300K.

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