

**HYPERFINE INTERACTION STUDY OF  $\text{LaMO}_3$  ( $M = \text{Cr, Mn, Fe, Co}$ ) PEROVSKITES****A. C. Junqueira, R. Dogra, A. W. Carbonari, R. N. Saxena, J. Mestnik-Filho, M. Morales***Instituto de Pesquisas Energéticas e Nucleares, IPEN-CNEN/SP, São Paulo, SP, Brasil*

Rare earth perovskite oxides of the type  $\text{LaMO}_3$  ( $M = 3d$  transition metal) exhibit a variety of unusual and interesting transport, magnetic and structural properties. These properties are strongly dependent on the deviation from the ideal cubic structure due to cation size mismatch, causing changes in the M-O bond lengths or M-O-M angles.

The perturbed angular correlation (PAC) technique was used to investigate the hyperfine interactions in the  $\text{LaMO}_3$  perovskites using dilute  $^{111}\text{In} \rightarrow ^{111}\text{Cd}$  nuclear probes introduced into the samples through a chemical process. The present measurements were performed at several temperatures ranging from 13K to 1324K. Two distinct electric quadrupole interactions were observed in  $\text{La}(\text{Cr,Fe})\text{O}_3$  compounds, with the lower quadrupole frequency assigned to the  $^{111}\text{Cd}$  probes at transition metal atom sites while the higher frequency was attributed to the probes at lanthanum sites in both cases. It has been further observed that the relative fractions of the probe nuclei at La and Cr(Fe) sites are highly dependent on the temperature at which the sample is sintered. Temperature dependence of the electric quadrupole interaction parameters indicated structural phase transitions which were associated with the change from orthorhombic to rhombohedral structure and characterized by a sudden increase in the electric field gradient  $V_{zz}$  and a decrease in the asymmetry parameter  $\eta$  for both sites. PAC spectra for  $\text{LaMnO}_3$  and  $\text{LaCoO}_3$  show a major fraction with sharp a frequency which was associated to the  $^{111}\text{Cd}$  probe substituting the Mn(Co) atom and a minor component with large frequency distribution. The temperature dependence of the electric field gradient (EFG) for the  $\text{LaCoO}_3$  did not show any symmetry related structural changes within the measured temperature range. The results in all cases reveal a linear dependence of the electric field gradient with temperature.