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Hypereine characterization of $BaTi_{1-x}Hf_xO_3$ for x≤m0.20

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Abstract

It is known that the substitution of cations in perovskites produce changes in the macroscopic properties of these materials. A case to study is for example the influence of 4^+-cation B' partially substituted by other 4^+-cation B' when ABO_3 is ferroelectric and $AB'O_3$ is paraelectric. In this work the system $BaTi_{1-x}Hf_xO_3$ with × = 0.05, 0.10, 0.15 and 0.20 is studied by Perturbed Angular Correlations (PAC) spectroscopy in order to get microscopic information through the electric field gradient tensor (EFG) produced by electrons close to probes. Samples were prepared by solid state reactions and characterized by x-ray powder diffraction analyses and irradiated with thermal neutrons to produce ^{181}Ta, the PAC probe. Two hyperfine quadrupole interactions were detected. One of them correspond to probes in sites with defects originated during the nuclear processes after neutron irradiation. The other probes are located in B sites. At RT the hyperfine parameters are analyzed in terms of Hf concentration.

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