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Qualitative analysis of KNN and PZT ceramics by Particle Induced X-Ray Emission and Rutherford Backscattering Spectrometry.

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The first results of scientific cooperation between Cuban and the Joint Institute for Nuclear Research (JINR) of Russian Federation researchers in the application of ion beam analysis (IBA) methods are presented. PIXE and RBS measurements were carried out at the EG-5 accelerator facilities of the Frank Laboratory of Neutron Physics (FLNP)/JINR, contributing this way to the characterization of $(K_{0.44}Na_{0.52}Li_{0.04})_{0.97}La_{0.01}Nb_{0.9}Ta_{0.1}O_3$ (KNN) and $Pb(Zr_{0.53}Ti_{0.47})O_3$:Gd (PZT:Gd) ceramic samples.

Samples were prepared at the Center of Nanoscience and Nanotechnology of the National Autonomous University of México (CNyN/UNAM) by researchers from the Faculty of Physics of Havana University, the Cuban Institute of Cybernetic, Mathematics and Physics (ICIMAF) and the CNyN/UNAM. Experimental data processing was achieved in parallel by researchers of the EG-5/FLNP/JINR and the Havana University (Institute of Materials Science and Technology - IMRE and Higher Institute of Technology and Applied Sciences - InSTEC).

As result of PIXE analysis, Na, Ta, Nb and K in one KNN ceramic sample; and Gd, Zr, Ti and Pb in the PZT:Gd ceramic were detected. On the other hand, the concentration profiles of Na, Ta, Nb, K and O in KNN samples, and of Gd, Zr, Ti and Pb in the PZT:Gd sample were obtained by RBS analysis, which was performed by applying the ion beam in two incident directions respect to the sample surface.

The present study is the first step to the further quantitative determination of elemental composition of these samples by IBA.

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