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Synthesis of $BaTiO_3$ Nanofibers with Oxigen Vacancies.

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The term nanotechnology is more common every time, much is said about the technological advances of the future based on nanostructured materials. But those applications begin with the research in basic science that is developed throughout the world.

The trend of research in the area of nanostructured materials has focused on modifying their ferroelectric nature and converting them into multiferroic materials. ABO_3 ferroelectric materials (A = K, Li, B = Ta, Nb or A = Ba, Sr, Pb, B = Ti) become multiferroic when they are brought to nanometric size [1], There is research on the effect of vacancies in the crystalline structure of ferroelectric materials, especially in the spintronic area , optics and electronics of the future [2].

The steps carried out for the preparation of the solution are described in detail in the reference [3], said solution is placed in the Nabond equipment pump to operate for 48 hours and be able to collect polymer nanofibers. The manufacture of the polymer fibers was carried out through the Electrospining technique, this is useful and practical. The morphology can be seen in Figure 1, where we see that the average diameter ranges between 80 Y 300 nm.

The present research focuses on the synthesis of $BaTiO_3$ nanofibers with oxygen vacancies. This synthesis was carried out in a drag chamber where the polymeric fibers are placed and during a heating process at 850c for 2 hours with a ramp of 3C per minute, once the time is reached it is allowed to cool to room temperature. To generate the vacancies of O, Ar and H are used as entrainment gases during heating and until room temperature is reached. The purpose is to generate the oxygen vacancies in the entire body of the nanofiber, not only on its surface, as seen in Fig 2.

The morphology, microstructure and crystalline structure were characterized through Scanning Electron X-ray Diffraction (XRD), Microscopy (SEM), Transmission Electron Microscopy (TEM), Energy Dispersion Spectrometry of X-ray (EDS) and Raman spectroscopy.

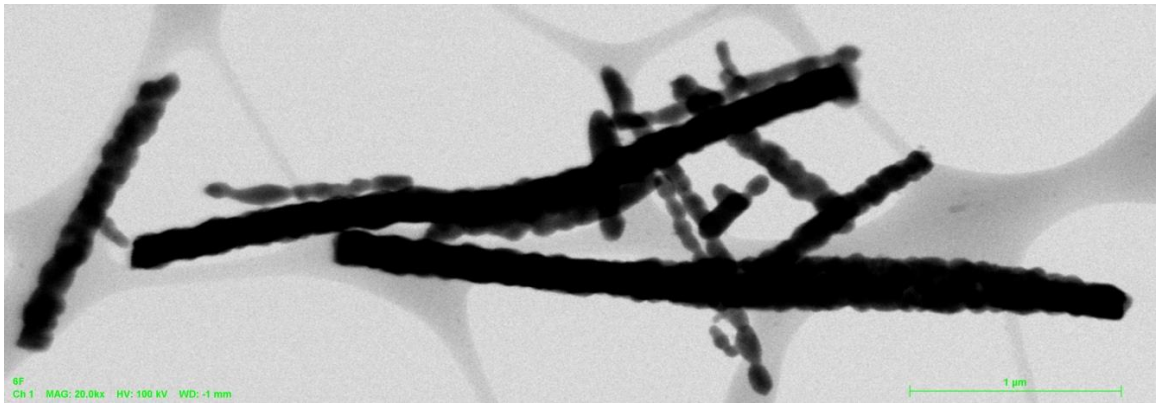

Figure 1. TEM image of $BaTiO_3$ nanofibers.

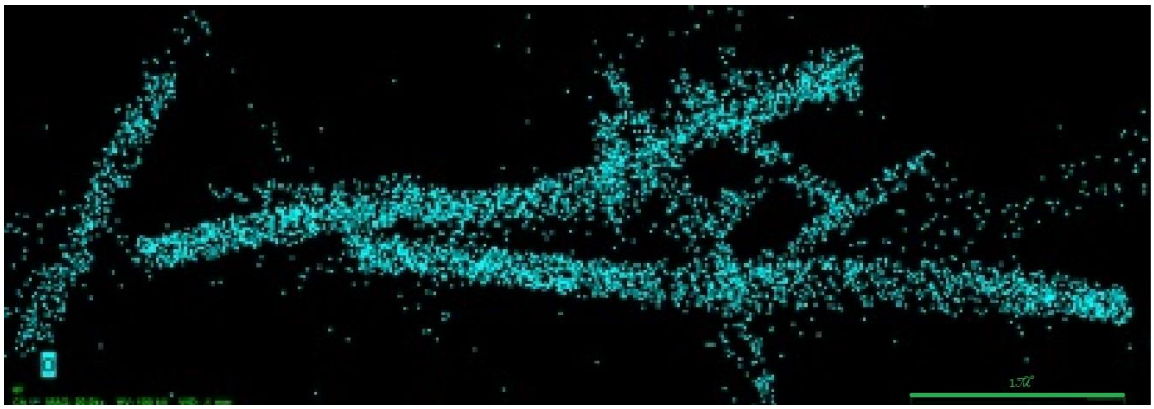

Figure 2. EDS image of oxygen vacancies $BaTiO_3$ nanofibers.

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