SYNTHESIS AND CHARACTERIZATION OF KBNNO PEROVSKITE VIA POLYMERIC PRECURSOR METHOD

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There are many synthesis routes for ceramic materials and oxides such as solid-solid reactions, precipitation reactions and polymeric precursor method (PPM). The PPM consists in the formation of a metallic complex using a hydrocarboxylic acid (e.g. citric acid) and the polymerization is due the heating of the complex solution with a polymerizing alcohol (e.g. ethylene glycol)[1]. After this, the homogeneous resin, the polymeric precursor, has the metallic ions distributed among the organic matrix, which will be pyrolized and then calcined which provides us the material powder. The PPM is a great method for the synthesis of ceramic materials and perovskites, specifically the perovskite with potassium, barium, nickel and niobium (KBNNO) due it low coast and the formation of nanoparticles[2]. The KBNNO perovskite has such a huge potential in photovoltaic cells when sintered. Sintering ensures that the material creates vacancies with the exit of the oxygen from the crystal lattice what causes a decrease in the band-gap energy and the optical band gap determines what portion of the solar spectrum a photovoltaic cell absorbs[3]. For the KBNNO perovskite, synthetized via solid reactions, shows us a band-gap of 1,39 eV corresponding to the infrared and red portion of the solar spectrum[4] and the major phase is the potassium niobate ($KNbO_3$), with about 90%, and the second major phase is barium niobate ($BaNbO_3$). The PPM provides results closes to the solid state reaction and a low in the temperature formation, from 950°C to 700°C.

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