Mechanochemical Synthesis and Characterization of Bismuth-Niobium Oxide Ion Conductors

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Abstract: *Bismuth niobate solid solutions, Bi_xNbO_δ ($2.5 \leq x \leq 6$), have been prepared using a mechanochemical method. The solid solutions were also prepared using a solid-state conventional method for comparison purposes. Bi_3NbO_7 was successfully obtained via a mechanochemical method at a lower synthesis temperature (milled at 1000 rpm for one hour followed by heating at 700°C for 24 h) than the conventional solid-state method. Electrical properties of the single-phase materials were studied by AC impedance spectroscopy. Further characterization of the materials was carried out using differential thermal analysis (DTA) and thermogravimetric analysis (TGA). The results showed that no thermal changes and phase transitions were observed and all materials were thermally stable.*

Keywords: Bismuth niobate, mechanochemical, solid-state reaction, impedance spectroscopy