

عنوان مقاله:

Reverse chemical co-precipitation: An effective method for synthesis of BiFeO₃ nanoparticles

محل انتشار:

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نویسندگان:

Hamid Sangian - *Materials and Metallurgical Engineering, Semnan University*

Omid Mirzaee - *Materials and Metallurgical Engineering, Semnan University*

Mohammad Tajally - *Materials and Metallurgical Engineering, Semnan University*

خلاصه مقاله:

The reverse co-precipitation method was used for synthesis of the pure phase multiferroic BiFeO₃ (BFO) nanoparticles. Influence of different pH values on the microstructure and magnetic properties of the BFO nanopowders was investigated. Thermogravimetric-differential thermal analysis (TG-DTA) technique indicated that the optimal temperature for calcination is 550°C. The phase formation and the existence of transient phases (like Bi₂5FeO₃₉ and Bi₂Fe₂O₉) has been studied using X-ray diffractometry (XRD). The morphological features of the nanopowders were characterized by field emission scanning electron microscopy (FESEM) and the presence of absorption bands at 400 to 3600 was investigated by Fourier transformed infrared (FTIR) spectroscopy. The magnetic properties of the synthesized powders were measured using vibrating sample magnetometry (VSM). The results showed that the BFO powders have R₃c crystal structure. The FESEM micrographs showed pseudo-cubic shape and particles size in the range of 25-236 nm. The magnetic hysteresis loops were indicated a weak ferromagnetic behavior of the samples at room temperature. Whereas the particles size of as-prepared powders were lower than the spiral spin cycloid (62 nm) and because of high surface-to-volume ratio of nanoparticles, which causes more uncompensated surface spins, the weak ferromagnetic behavior has been seen.

کلمات کلیدی:

Reverse co, Precipitation, Bismuth ferrite, Magnetic properties

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