Brahim Abraime, J Material Sci Eng 2019, Volume 8
DOI: 10.4172/2169-0022-C1-125

Experimental investigation of structural and magnetic properties of $CoFe_2O_4$ nanopowder for permanent magnet application

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In this study, we report the behavior of maximum energy product $(BH)_{max}$ of cobalt ferrite nanopowder towards the variation of calcinations temperature. The studied $CoFe_2O_4$ nanopowder was synthesized using sol-gel autocombustion method. X-ray diffraction, scanning electron microscopy, Mössbauer spectroscopy and superconducting quantum interference device magnetometer techniques were used to characterize crystal structure, phase composition, morphology and magnetic properties. By changing the calcination temperature (T= 600°C, 800°C, 1000°C and 1100°C), the structural and magnetic properties of the compounds could be tuned. The magnetic properties results show that the highest value of $(BH)_{max}$ is close to 0.35 MGOe observed for the sample calcined at T=800°C. These results suggest that $(BH)_{max}$ of cobalt ferrite nanopowder can be enhanced by optimizing synthesis steps.

Biography

Brahim Abraime is preparing his PhD at MAScIR foundation and at the Faculty of Science Rabat. He is working on the development and valorization of spinel and hexagonal ferrites for permanent magnet application, using different synthesis methods such as: solid state reaction and sol-gel auto combustion. He has three papers in this research area in Ceramics International (Impact Factor=3) and Journal of Magnetism and Magnetic Materials (Impact Factor=3)).

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