

Room temperature ferromagnetism in Fe-doped LaTiO₃ nanofibers

Perovskite Fe-doped LaTiO₃ nanofibers were fabricated by simple electrospinning using a solution that contained poly(vinylpyrrolidone) (PVP), Lanthanum nitrate (La(NO₃)₃·6H₂O) and Diisopropoxytitanium bis(acetylacetonate) solution. The Fe-doped LaTiO₃ nanofibers with average diameters of 100 - 200 nm were successfully obtained from calcination of the as-spun Fe-doped LaTiO₃/PVP composite nanofibers at 800 oC in argon for 2 h. The as-spun and Fe-doped LaTiO₃ nanofibers were characterized by SEM, XRD, TEM, and VSM. The results of XRD and TEM with selected electron diffraction (SEAD) analysis indicated that the calcined samples of Fe-doped LaTiO₃/PVP composite nanofibers had cubic perovskite structure. Room temperature magnetization results showed ferromagnetic behavior in the calcined samples having clear hysteresis ferromagnetism in the field range of ± 5000 Oe. The saturation specific magnetization (M_s) increased with increase in Fe proportion. The M_s and coercivity (H_c) values of the samples were in the ranges of 0.22 - 0.92 emu/g and 220 - 246 Oe, respectively.

Keywords : Electrospinning, nanofibers, lanthanum titanate, ferromagnetic and diluted magnetic oxide.

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