

Synthesis of PVDF/CoFe₂O₄ magnetoelectric films via two-step electrospinning

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Ceramic-based magnetoelectric (ME) composites such as FeCo/PZT, Ni/BaTiO₃ and Ni/PMN-PT/Ni have been intensively studied due to their high ME coupling effect. Even though high ME performances have been continuously reported in the bulk ceramic composites, there are serious problems such as high cost, high processing temperature and brittle mechanical property for practical ME applications.

In this study, we introduce polymer-based ME composites consisting of polyvinylidene fluoride (PVDF) as a piezoelectric matrix and CoFe₂O₄ (CFO) nanoparticles as a magnetostrictive fillers. In particular, the ME composites were synthesized by two-step electrospinning to obtain beta phase crystalline for high piezoelectric property and to form dense composite structures minimizing pores for low current leakage. This study can be a good reference for flexible ME sensors and energy harvesters. This research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (2016R1C1B1010884).