

Fe₂O₃가 첨가된 Pb(Ni_{1/3}Nb_{2/3})O₃ - PbTiO₃ - PbZrO₃ 세라믹의 바이몰프 액츄에이터를 이용한 에너지 하베스팅

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Energy Harvesting from the Bimorph Actuator using Fe₂O₃ Added Pb(Ni_{1/3}Nb_{2/3})O₃ - PbTiO₃ - PbZrO₃ Ceramics

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Abstract : Fe₂O₃ added Pb(Ni_{1/3}Nb_{2/3})O₃-PbTiO₃-PbZrO₃ (PNN-PT-PZ) ceramics were produced in order to use them as a bimorph actuator for energy harvesting. Especially, the 0.25 wt% Fe₂O₃ added 0.4PNN-0.357PT-0.243PZ, having the composition of morphotropic phase boundary, showed good piezoelectric properties of d₃₃ of 810 pC/N, k_p of 77% and Q_m of 55 along with a high Curie temperature of 210°C. A bimorph actuator, composed of the two piezoelectric layers bonded together with a phosphorous bronze layer as a central metallic electrode, was successfully fabricated. The bimorph actuator, vibrated with a 1.3 mm amplitude at 68 Hz, produced high electric power of approximately 60 mW.

Key Words : PNN-PT-PZ ceramics, bimorph actuator, energy harvesting, piezoelectric properties