Enabling strong magnetoelectric 2-2 composites made of AlN films grown by plasma-enhanced ALD on magnetostrictive foils for energy harvesting applications

References

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[3] V. Tarala, M. Ambartsumov, A. Altakhov, V. Martens, and M. Shevchenko, *J. Cryst. Growth*, 455 (2016), pp. 157-160.

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Table 1. The PE-ALD grown conditions of synthesized samples using trimethylaluminum (TMA) precursor associated with $N_2/H_2/Ar$.

Samples	Growth temperature (°C)	Purging time (s)	Thickness (nm)
A1	180	5	600
A2	250	10	120
A3	250	20	157
A4	250	30	160
A5	250	30	590

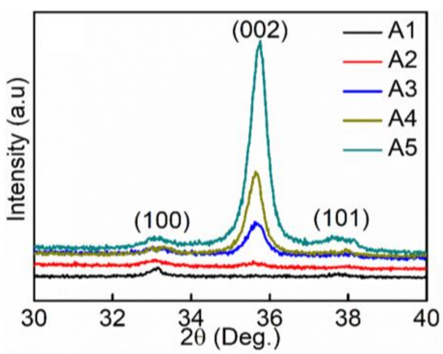

Fig. 1: Grazing incidence X-ray diffraction (GIXRD) data of AlN films A1–A5 grown on (100) silicon with a 150 nm of nickel layer.

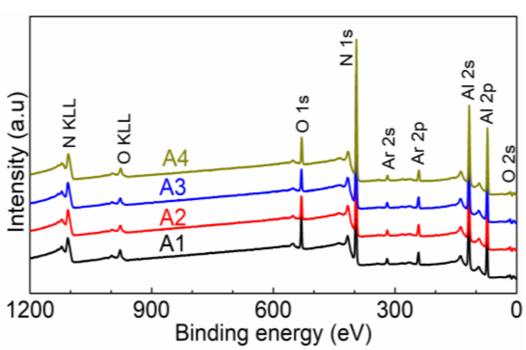

Fig. 2: X-ray diffractometry (XPS) survey scans of AlN films grown on (100) silicon substrates after surface cleaning by Ar+ sputtering.

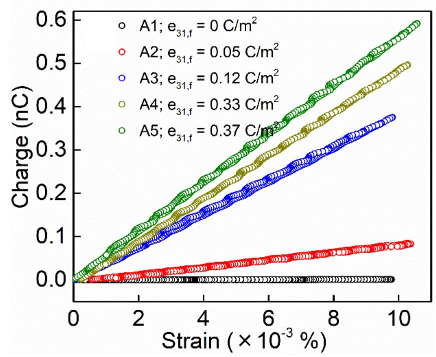

Fig. 3: Four-point bending measurement of generated charges under strain on AlN films on (100) silicon substrates coated by a 150 nm nickel layer as a bottom electrode and 100 nm of aluminum as top electrodes.

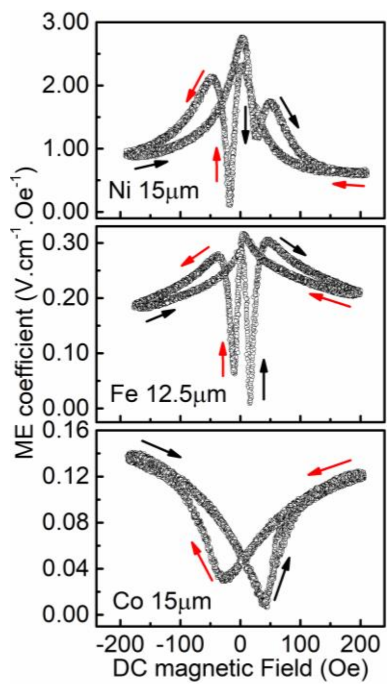

Fig. 4: Magnetoelectric coefficient of the 590nm-thick AlN film (A5) on 15µm-thick nickel (top), 12.5µm-thick iron (middle), 15µm-thick cobalt (bottom) foils. The black and red arrows describe the forward ($-H_{dc}$ to H_{dc}) and backward (H_{dc} to $-H_{dc}$) bias magnetization processes, respectively.