

Fabrication of cellulose/Ni Me laminates for high ME responses

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In literature, Magnetolectric (ME) composites, which can generate voltage by applying an external bias magnetic field, have attracted a lot of interest in the field of various industries. Recently, cellulose, which exhibits piezoelectric (PE) properties as an external strain is transferred, has emerged as a candidate for the PE phase of ME composites. Especially, cellulose based ME composites do not require to conduct a poling process by self-poled cellulose film. In spite of this attractive nature, there is still limitation regarding binder, which hinders strain transfer from magnetostrictive (MS) to PE phase.

In this study, Binder-free cellulose based ME laminate composites are introduced to exclude an obstruction which is attributed by adhesive binder. To implement the binder-less composite, hydrophilic pre-treated Ni foil and cellulose gel are merged together during the drying process at once. The composite can be expected with the following merits, (i) High strain transfer rate by binder-free, (ii) Enhanced interaction via surface modification for strong adhesion and well aligned dipoles, (iii) Reduction of total process for fabrication through non-poling process.