**Low-cost 3D-printed piezoelecrets based on foamed PLA for energy harvesting devices**

Piezoelectrets are electroactive materials with an electrically charged cellular structure that can convert mechanical energy into electric energy and viceversa. They are mainly based on PP or PET polymers, showing sizable electromechanical and piezoelectric coefficients but they are carbon-based and fabricated from fossil fuels, so they do not comply eco-friendly policies. In this work the material used for the fabrication of the samples is an innovative and biodegradable polylactic acid (PLA) filament that can be foamed during printing due to the expansion of a blowing agent, controlled through the extrusion temperature and flow rate parameters. Afterwards the samples were polarized in a negative corona charging setup while heating and the surface potential value was measured through an electrometer. We investigated the efficacy of the thermal treatment on charging efficiency and temporal stability of the induced potential. We finally measured the effective piezoelectric d33 coefficient of foamed PLA samples together with an estimate of the surface charge density. In conclusion, we present an innovative production of a sustainable electroactive material developed in a double-step process and a low-cost fully 3D-printed electrostatic device for energy harvesting from conception to testing.