

Abstract: An extremely effective and practical approach to improving the thermal stability of charge and thus piezoelectricity of cellular polypropylene ferroelectrets is proposed and its effectiveness is experimentally validated in this report. The approach is fluorination and subsequent isothermal crystallization treatment. Astonishing charge stability is discovered by the measurements of open-circuit TSD current, charge TSD and isothermal charge decay. For instance, the charge for samples treated by the approach remains about 72% of the initial value, whereas the corresponding value is only 30% for the virginal sample after 6.5 h of isothermal charge decay at 90 °C . This is attributed to the changes in composition and structure by fluorination and isothermal crystallization as indicated by IR analysis and XRD because the treatments almost completely eliminate shallow charge traps and significantly deepen deep traps