

Abstract: To improve the thermal stability of piezoelectricity of polypropylene (PP) ferroelectrets, chemical modification of the cellular PP film was performed via chromic acid oxidation and then hydrofluoric acid treatment. Deep chemical modification is achieved as indicated by the energy-dispersive X-ray analyses on the cross-section of the modified cellular PP film. The results of the isothermal decay for piezoelectric d_{33} -coefficient at 70°C indicate the improved thermal stability of piezoelectricity and the enhanced piezoelectric activity of the modified PP ferroelectrets. The former is attributed to the improvement of thermal stability of the charges trapped in the internal void surface layers as indicated by the thermally stimulated discharge measurements, while the latter results not only from the improved thermal stability of the charges but also from the reduction in Young modulus of the PP ferroelectrets due to the chemical modification as revealed by the dielectric resonance analyses.