Abstract： Direct fluorination using fluorine gas, as one of the most effective approaches to the chemical modification of polymers, was used to improve the thermal stability of piezoelectricity of the polypropylene (PP) ferroelectrets. High fluorination degree was obtained as indicated by attenuated total reflection infrared spectroscopy. The results of the isothermal decay of the piezoelectric *d*-coefficient at 70 ℃ indicated the improved thermal stability of piezoelectricity and the enhanced piezoelectric activity of the fluorinated PP ferroelectrets. The improved thermal stability of piezoelectricity is attributed to the improvement in thermal stability of the charges on the internal void surfaces as indicated by the thermally stimulated discharge measurements, while the enhanced piezoelectric activity is ascribed not only to the improved thermal stability of the charges but also to the reduction in Young's modulus of the PP ferroelectrets due to fluorination as revealed by the dielectric resonance analyses.