

Spectroscopic Studies on the Effect of Field Strength upon
the Curie Transition of a Vinylidene/Trifluoroethylene Copolymer

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With infrared spectroscopic studies on the various effects of field strength upon the ferroelectric phase transition behavior of a VDF/TrFE(75/25) copolymer upon heating and cooling in the presence of the electric field, new findings have been made. The paraelectric phase in the absence of the field resembles more the α phase of PVDF with a trace of short-trans sequences distributed irregularly along chain axis. The paraelectric phase in the presence of the high field is much different from that without field. The paraelectric phase with the field has much longer trans sequences included in it. The Curie transition temperature (T_c^\uparrow) is elevated from 120 to 135°C significantly under the field of more than 0.4 MV/cm, showing the first order transition phenomenon. The phase transition behavior upon cooling with the field does not show a clear transition, but a continuous change as a function of temperature. The field induced phase transition and loss of dipole switchability observed below a cooling temperature of 120°C upon the application of cyclic bipolar electric field, and the time and field strength dependence of the field induced phase transition are discussed.