

Thermally Stimulated Depolarization Current (TSDC) and Transient Current Study in Polysulfone (PSF) and Polyvinylidene fluoride (PVDF) Blends

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Abstract : In the present investigations, an attempt has been made to study the charge storage mechanism and mechanism for the flow of transient charging and discharging current in an amorphous polymer (Polysulfone) (PSF) and a semi-crystalline polar Polyvinylidene fluoride (PVDF) blends in ratio PSF: PVDF: 80:20;85:15;90:10 and 95:05 at various poling temperatures (i.e. 60, 75, 90 and 1150C) and with field strength (100, 150, 200 and 250kVcm⁻¹). Thermally stimulated depolarizing current TSDC thermograms for (Polysulfone (PSF) and Polyvinylidene fluoride (PVDF) Blends sample have been obtained under different polarizing conditions. Peaks are found at high-temperature side. The variation of structure on blending and poling condition affects the magnitude of TSDC. The activation energy values have been calculated using the initial rise method of Garlick and Gibson. The transient current with the similar polarizing condition has been investigated over a period of 3X10³ sec. The observed characteristics obey Curie-Von Schweidler law in the studied temperature range. The charging current versus polarizing temperature curves at a constant time, i.e., isochronal current characteristics were studied and the activation energies were calculated. The activation energy in transient thermograms calculated by different methods is in good agreement with the values obtained from TSDC studies.

Keywords : activation energy, polysulfone (PSF), polyvinylidene fluoride (PVDF), thermally stimulated depolarizing current (TSDC)

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