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Study of temperature effects on the electrical behavior of polypropylene-clay nanocomposites submitted to electron beam irradiation in a SEM

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Highlights

- Influence of temperature on the space charge accumulation and discharge of in Polypropylene (PP0%) and its nanocomposites (NCs) with different contents of natural clay (PP2% and PP6%).
- A modified special device attached to the SEM able to measure simultaneously and separately the leakage and the displacement currents under controlled temperatures.
- Ability of Polymer nanocomposites (PNCs) to accumulate the charges decreases with temperature but at a given temperature, the trapped charge at steady state increases when the nanoclay content increases
- Effective mobility of charge carriers is higher for the nanocomposites until a concentration threshold and this difference accentuates at higher temperatures.
- Secondary electron emission (SEE) yield at the beginning of irradiation increases and then decreases as a function of temperature but at the saturation this yield decreases when the temperature increases.

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