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Dielectric Response of Nano Aluminium Tri-hydrate Filled Silicone Rubber**Dielectric Response of Nano Aluminium Tri-hydrate Filled Silicone Rubber**

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ABSTRACT: The dielectric response of a nano-ATH (Aluminium Tri-hydrate) filled silicone rubber is investigated over the frequency range 10^{-4} to 10^3 Hz and compared with that of the micro-ATH composite. An equivalent circuit has been used to decompose the dielectric response into: a loss peak process, a quasi-dc (Q-DC) process, a dc-conductance and constant high frequency capacitance. It was found that the Q-DC and loss peak were a result of the ATH filler with the loss peak more clearly resolved in the nano-ATH filled material than in the micro-ATH material where it is weaker and partly obscured by the Q-DC process. In contrast to the micro-ATH material the characteristic frequencies of all the dielectric responses in the nano-ATH filled samples have the same activation energy. The physical mechanisms of the Q-DC process and loss peak are discussed in terms of long range transport between nano-ATH clusters and the dipolar behavior of isolated clusters respectively.

Keywords: A. Polymer-matrix composites, A. Nano particles, B. Electrical properties, B.

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