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Electric-Field-Induced Hopping Conductivity in Polymers
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— The resistivity of highly insulating polymers exhibits a dependence on electric field strength. Mott and Davis as well as Poole and Frankle describe theoretically the resistivity of disordered semiconductors, when subject to a changing electric field, in terms of hopping conductivity models. Although such models have often been applied to polymers, there is little direct experimental evidence to confirm the validity of these theories when applied to polymers. We present such results for a newly-developed block co-polymer Hytrel, a highly insulating material. The constant voltage resistivity test method has been used to study Hytrel for a range of electric fields approaching electrostatic breakdown. Previously taken preliminary measurements are suggestive that Hytrel validates hopping conductivity models. With additional data we consider whether the Hytrel results are consistent with existing models of electric-field induced hopping conductivity.

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