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Molecular Crystals and Liquid Crystals
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/gmcl16

Electrically Conductive Polyacetylene/Elastomer Blends

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Version of record first published: 20 Apr 2011.

To cite this article: Michael Rubner , Kang Lee , Sukant Tripathy , Patricia Morris , Jacoue Georger Jr. & Harriet Jozpson (1984): Electrically Conductive Polyacetylene/Elastomer Blends, Molecular Crystals and Liquid Crystals, 106:3-4, 408-408

To link to this article: http://dx.doi.org/10.1080/00268948408071461

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Mol. Cryst. Liq. Cryst., 1984, Vol. 106, p. 408
0026-8941/84/1064-0408/$18.50/0
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Printed in the United States of America

ELECTRICALLY CONDUCTIVE POLYACETYLENE/ELASTOMER BLENDS

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Abstract. Polymer blends of polyacetylene with elastomers such as polybutadiene and thermoplastic elastomers such as the styrene-butadiene-styrene copolymers have been prepared and examined. The resultant blends were charcterized by infrared spectroscopy, thermal analysis, x-ray diffraction techniques, and transmission electron microscopy. The blends were found to exist as two-phase systems consisting of crystalline polyacetylene and an amorphous rubbery component. In the case of the thermoplastic elastomer blends, electron microscopy revealed that polyacetylene was incorporated in the rubber matrix rather than the glassy polystyrene domains. Doping blends with electron acceptors such as iodine and ferric chloride resulted in electrical conductivities in the 10-100 $ohm^{-1}cm^{-1}$ range. Further enhancement of the electrical conductivity of the blends was obtained by stretch elongation of the blends prior to doping. Details of the physical properties of these blends and their microstructure will be presented.

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