Preparation of Conductive Polyaniline/ Chlorosulfonated Polyethylene Blend via Solution Mixing and Study of Their Properties

Elaheh.Bakhtiarian\textsuperscript{a,b,c}, Peter Foot\textsuperscript{c}

(a) Islamic Azad University, Oxford Branch, Oxford, United Kingdom
(b) Dept. of Chem., Islamic Azad University, South Tehran Branch, Tehran, Iran, K0852641@Kingston.ac.uk
(c) Materials Research Group, Faculty of Science, Engineering and Computing, Kingston University, Penrhyn Road, Kingston upon Thames, Surrey KT1 2EE, United Kingdom

Polyaniline soluble in organic solvents was prepared by oxidative polymerisation of aniline in dodecylbenzenesulphonic acid (DBSA) media. The solubility parameter was calculated [1] and the most suitable solvent (tetrahydrofuran) was selected [2] for the solubility and the most compatible polymer chlorosulfonated polyethylene [PCSPE] was selected for blending. Blending of polyaniline dodecylbenzenesulfonate (PAni.DBSA) with poly chlorosulfonated polyethylene was carried out via solution mixing.

Morphological studies were carried out by optical microscopy and TEM, and thermal analysis was performed. All the techniques showed a good degree of compatibility between the two polymers.

The electrical conductivities of blends with proportions of 1 to 50 wt% PAni.DBSA were measured by 2- and 4-probe techniques. The electrical conductivity increased as the weight percent of PAni.DBSA increased, showing a percolation threshold [3] below 1% by mass, which was explained by a change in the conformation of the polymeric chains leading to an increase in the conductivity. The critical exponent [4] was estimated.

Keywords: conductive polymers; blends; PAni.DBSA; poly(chlorosulfonated polyethylene); conducting blends

References