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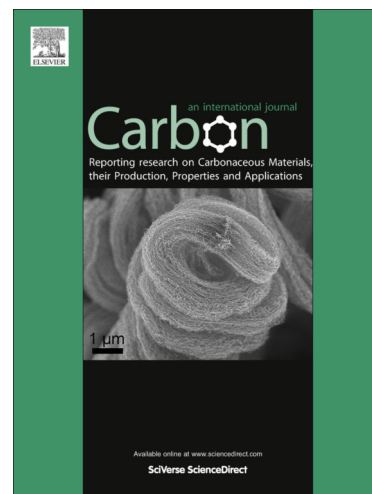
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Preparation of carbon fibers from linear low density polyethylene

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Abstract

Carbon fibers were produced from linear low density polyethylene (LLDPE) instead of commonly used precursors, such as viscose rayon, mesophase pitch and polyacrylonitrile (PAN). Cross-linked fibers were produced at various temperatures, times and stress conditions during a sulfuric acid treatment using LLDPE fibers obtained from dry-wet spinning. The effects of cross-linking were analyzed using a range of characterization techniques, such as differential scanning calorimetry, color change, fourier transform infrared spectroscopy, elemental analysis, density, scanning electron microscopy, and single filament mechanical properties. The carbonization process of cross-linked fibers was carried out at 950°C for 5 minutes in a nitrogen atmosphere. The carbon fibers with the best mechanical properties were obtained from the cross-linked fiber with the highest tensile modulus. In particular, the carbon fibers with the best mechanical properties (tensile strength and tensile modulus of 1.65 GPa and 110 GPa, respectively), similar to commercial-grade carbon fiber, were obtained from the cross-linked fiber that had undergone a carbonization process with a

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