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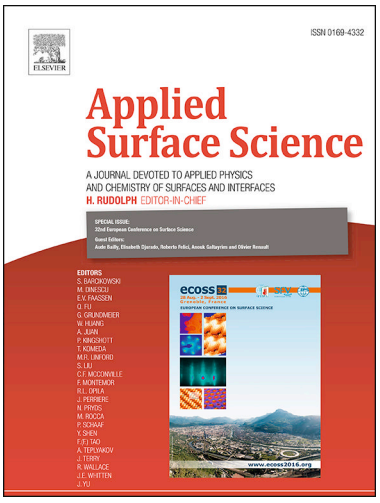

Full Length Article

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Preparation of Polyetherimide nanoparticles on carbon fiber surface via evaporation induced surface modification method and its effect on tensile strength and interfacial shear strength

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Abstract: In this work, polyetherimide (PEI) nanoparticles were prepared on carbon fiber (CF) surfaces via an evaporation-induced surface modification method. Scanning electron microscopy analysis revealed that the average diameter of the PEI nanoparticles linearly increased with increasing PEI concentration. This finding indicated that the nanoparticle size on the CF surface could be controlled by changing the PEI concentration used in the surface modification process. The possible formation mechanism of the PEI nanoparticles on the CF surfaces was also investigated by cross-section observation of CF using field-emission scanning electron microscopy (FE-SEM). In addition, the single fiber strength and interfacial shear strength between the CFs and epoxy resin were observed to increase after the surface modification. The interfacial shear strength (IFSS) results between treated CF before and after heating show that the presence of PEI nanoparticles had a great influence on IFSS. At a PEI concentration of 0.2%, the IFSS value reached its maximum value, 44.02% more than