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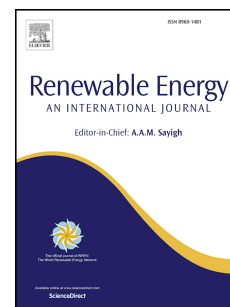
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**Enhanced Fluorescence Polarization of Fluorescent Polycarbonate/Zirconia
Nanocomposites for Second Generation Luminescent Solar Concentrators**

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Abstract

Transparent nanocomposite films were spin-coated from sulfonic acid modified polycarbonate and fluorescent dye 3-(benzothiazol-2-yl)-7-(diethylamino)-2-oxo-2H-1-benzopyran-4-carbonitrile) and doped with different concentrations of ZrO₂ nanoparticles to form fluorescent PC/ZrO₂ nanocomposite films. The refractive index of the investigated nanocomposite films was increased by increasing the amount of ZrO₂ NPs. It was also found that, adding zirconia nanoparticles controlled the orientation of dye molecules in PC host leading to enhanced fluorescence anisotropy. The trapping efficiency was calculated as a function of dipole orientation for all concentrations of ZrO₂ NPs and reached 96.5% for vertically aligned dye molecules and 90.6% for horizontally aligned. These results indicated that aligning the transition dipoles of dye molecules is promising for the enhancement of the edge emission of luminescent solar concentrator (LSC) waveguides.

Keywords: Polycarbonate, ZrO₂ nanoparticles, Fluorescence Polarization, luminescent solar concentrators.

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