

Rational Molecule Design for Improving Thermal Properties of Sulfur Copolymer via Inverse Vulcanization

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We designed and synthesized an organic comonomer to enhance the thermal and optical properties of sulfur copolymer prepared via inverse vulcanization. Synthetic comonomer have structural feature that dramatically improve the glass transition temperature (T_g) without disturbing the mid-IR transmittance and also improve the refractive index. The sulfur copolymer via the inverse vulcanization of sulfur and new organic comonomer (50 wt% sulfur content copolymer) shows high T_g value (70 °C) and high refractive index ($n > 1.83$) at 637 nm. As a result, this new sulfur copolymer exhibit the excellent refractive index, mid-IR transmittance and thermal stability make it a new proposal for IR thermal imaging applications.