

A new copper(I) coordination polymer from 2,6-bis(1H-benzotriazol-1-ylmethyl)pyridine: Synthesis, characterization, and use as additive in transparent submicron UV filters

Nuñez-Dallos N.

Lopez-Barbosa N.

Muñoz-Castro A.

Mac-Leod Carey D.

De Nisi A.

Monari M.

Osma J.F.

Hurtado J.

The use of a new copper(I) coordination polymer (CP) as additive in transparent composite films of 190 nm of thickness for ultraviolet (UV) shielding is presented. The luminescent 1-D Cu(I) CP was easily synthesized through a self-assembly process between Cu(I) iodide and 2,6-bis(1H-benzotriazol-1-ylmethyl)pyridine (L). The CP, $[\text{Cu}_2(\text{I})_2(\text{L})_2]_n$, was structurally characterized by infrared, UV-visible diffuse reflectance and photoluminescence spectroscopy, elemental and thermogravimetric analyses, single-crystal and powder X-ray diffraction, and relativistic density functional theory calculations. The CP was dispersed and immobilized into a polymeric matrix in the presence of Sudan I, yielding a composite material that exhibits a reduction of 49% of the UV transmittance at 350 nm. Thus, the use of a new Cu(I) CP in polymeric composite films appears as a novel approach toward ultrathin and transparent UV shielding films, which have potential applications as protection layers of paints and coatings that tend to degrade when exposed to UV radiation. © 2017 Informa UK Limited, trading as Taylor & Francis Group.

Copper(I) coordination polymer

crystal structure

luminescence

polymeric composites

ultraviolet filters