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Thermal Analysis, RAMAN Spectroscopy and Scanning Electron Microscopy of New Polymeric Material Containing In-Chain Ruthenium Complex: poli-{trans-[RuCl₂(vpy)₄]-co-styrene} and poli -{trans-[RuCl₂(vpy)₄]-4 vinylpyridine-styrene}

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This work reports the preparation and characterization of the binary copolymer poli-{*trans*-[RuCl₂(vpy)₄]-co-styrene} and the ternary poli-{*trans*-[RuCl₂(vpy)₄]-4 vinylpyridine-styrene}, obtained through the chemical reaction between *trans*-[RuCl₂(vpy)₄] (vpy is 4-vinylpyridine), 4-vinylpyridine and styrene (ST) using benzoyl peroxide. The synthesis was controlled by thin layer chromatography (TLC) and by monitoring the viscosity of the reactional medium. The resulting copolymers are characterized by means of UV-vis spectroscopy, thermal analysis, RAMAN Spectroscopy and Scanning Electron Microscopy (SEM). The thermal properties of the copolymer was reported by differential scanning calorimetry (DSC), thermogravimetric differential analysis (TG/DTA) and Dynamical-thermal-mechanical analysis (DTMA). The film structure and morphology were studied by Raman spectroscopy and SEM. Raman spectroscopy results showed that the polymerization takes place from both, the vinyl group of the metal complex monomer and the vinyl group of the vinyl monomer, demonstrating the complex incorporation in the polymer matrix. Additionally, the Raman results show that the redox polymer structure of the copolymer is very similar to that of the monomer. The properties of both materials are discussed.