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INFLUENCE OF THE CATALYTIC SYSTEM ON THE SYNTHESIS AND PHYSICOCHEMICAL PROPERTIES OF POLY(PHENYLENE OXIDE) OBTAINED BY THE OXIDATIVE POLYMERIZATION

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Poly(2,6-dimethyl-1,4-phenylene ether) also known as a poly(phenylene oxide) (PPO) is a commercially important thermoplastic material. Polymer shows excellent mechanical properties at elevated temperature, a good resistance to wide range of chemicals and low moisture absorption. Due to its high glass-transition temperature, it is often blended with other thermoplastic polymeric materials, what reduces the T_g value and makes processing easier. PPO blends are widely used in many industrial applications.

In this work, the results concerning the influence of various catalytic systems on the oxidative polymerization of 2,6-dimethylphenol in organic solvents (toluene, ethanol) are presented. The catalytic system based on copper (II) metal salts and amine ligands (morpholine, dibutylamine), with various mass ratio of the components was applied. The efficiency of the 2,6-dimethylphenol conversion to the polymer was evaluated on the basis of the polymer yield. Additionally, influence of the chain stopper (2,4,6-trimethylphenol) was investigated. The oxidative polymerization reaction of 2,6-dimethylphenol was conducted by solution or precipitation methods. The physicochemical properties of the polymers were determined by gel permeation chromatography (GPC), limiting viscosity number (LVN) and melt flow rate (MFR) measurements. The obtained results show the highest efficiency of the copper (II) bromide – dibutylamine complex in the solution method, whilst the best results in the precipitation polymerization were obtained with use of copper (II) chloride-morpholine complex.

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