Atom Transfer Rearrangement Radical Polymerization of Diamminebis(2,4,6-trihalophenolato)copper(II) Complexes in the Solid State

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The synthesis of the poly(dichloro- or dibromophenylene oxide)s was achieved by the thermal decomposition of diammine-bis(2,4,6-trihalophenolato)copper(II) complexes in the solid state by atom transfer rearrangement radical polymerization. The thermal decomposition was performed either at different temperature ranges, 110-250 °C, for 3 h, or at the maximum conversion temperature for different time intervals, 3-48 h. Maximum yields of polymers were obtained at 190 °C and 3 h. The polymers were characterized by FTIR, ¹H and ¹³C NMR spectroscopy, SEM, TGA and molecular weight determination by viscometrical methods. All the polymers were rigid, having high T_g values between 178 and 189 °C. Only small amounts of Cu were detected by AAS.

Key words: Atom Transfer Rearrangement Radical Polymerization (ATRRP), Diammine-bis(trihalophenolato) Copper(II), Poly(dihalophenylene Oxide), Solid State Polymerization