

Synthesis of New Polyamidoximes and Their Crosslinking by Transition Metal Ions

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Synopsis

Three new polyamidoximes (PAO) having appropriate functionalities to bind transition metal ions were prepared. The polymers were obtained by the reaction of dichlorooximino ethane with the corresponding diamine. Characterization and crosslinking of PAOs via coordination with transition metal ions such as Ni(II), Co(II), Cu(II), and $UO_2(II)$ are presented. The crosslinked polymer complexes exhibit good thermal stability. It was also found that both square planar and tetrahedral coordination structures are present in the crosslinked polymers.

INTRODUCTION

Metal ions may be chelated to a polymer in several ways.¹ One is the use of an organic molecule possessing a suitable number of functional groups by which coordination with metal ions causes polymerization. Polymerization and copolymerization of metal containing monomers is another method² to synthesize corresponding polymers wherein practically all functional groups are bound to the metal. Alternatively, attachment of suitable ligands to preformed polymer as terminal or pendant units would afford a convenient procedure for chain extension or crosslinking by coordination with metal ions.

In this article we report the synthesis and characterization of new polyamidoximes (PAO) having appropriate functionality for subsequent coordination with transition metals which results in crosslinking.

RESULTS AND DISCUSSION

Generally amidoximes cannot be synthesized by the reaction of an amide and hydroxylamine due to the reduced activity of carbonyl group in the amide. One way³ to synthesize amidoximes is to treat hydroxamic acid chlorides with primary or secondary amines. In this work, three new PAOs have been obtained by the reaction of dichlorodioximino ether (DDE) with benzidine, *trans*-4,4'-diaminodibenzo-18-crown-6 (DADC) and with a mixture

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