

Synthesis, Characterization and Catalytic Activity of N,N'-Bis(3-Allyl Salicylidene)Ethylenediamine Cobalt (II) Schiff Base Complex Anchored on a new Polymer Support.

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Abstract

A new chelating polymer support has been prepared by suspension copolymerization of synthesized N,N-bis(3 allyl salicylidene) ethylenediamine monomer Schiff base (N,N'-BSEDA) with styrene (St) and divinylbenzene (DVB) using azobisisobutyronitrile (AIBN) as initiator in the presence of poly(vinyl alcohol). The content and complexation ability of monomer Schiff base (N,N'-BSEDA) for cobalt(II) ions in prepared crosslinked polymer beads have shown dependence on the amount of DVB used in reaction mixture. The amount of monomer Schiff base (N,N'-BSEDA) in crosslinked beads showed a substantial decreasing trend at high concentration of DVB in the reaction mixture ($>1.5 \text{ mol dm}^3$), hence the efficiency of complexation (EC%) and cobalt(II) ion loading (EL%) of polymer beads showed a decreasing trend. The structure of monomer Schiff base (N,N'-BSEDA) and its cobalt(II) complex on polymer support was elucidated by IR, UV and magnetic measurements. The catalytic activity of polymer bound cobalt(II) Schiff base complex was evaluated by analyzing kinetic data of decomposition of hydrogen peroxide in the presence of either supported cobalt(II) complex or free cobalt(II) complex. The activation energy for the decomposition of hydrogen peroxide by polymer supported cobalt(II) complex was found to be low ($33.37 \text{ kJ mol}^{-1}$) in comparison with unsupported cobalt(II) complex ($56.35 \text{ kJ mol}^{-1}$). , reaction steps are proposed and a suitable rate expression derived.