SILICA POLYAMINE COMPOSITES AS CATALYSTS OF AROMATIC COMPOUNDS HYDROXYLATION BY HYDROGEN PEROXIDE

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Organic-inorganic composites offer a perspective approach to create new materials with specific properties. Their properties can be modified in wide range due to variation of inorganic and organic (e.g. polymeric) building blocks. Compounds based on silica and polyamines can be use for extraction of different ions and their separation [1]. Transition metal complexes formed in this processes can be useful as catalytic active materials. Reactions proceeding inside polymeric matrix leads to minimizing diffusion limits, and high stability of complexes prevent deactivation of solid catalysts due to leaching.

Catalytic activity of iron (III) and copper (II) complexes based on organic-inorganic hybrid materials in aromatic compounds hydroxylation by hydrogen peroxide in water/acetonitrile mixtures was investigated in present research. Silica polyamine composites were synthesized according to [2]. All metal complexes were characterized by XPS, EPR, IR, SEM, UV-visible reflection spectroscopy.

Fig. 1. Hybrid material Cu^{2+}–WP1.

Copper (II) complexes are demonstrated to be the most selective catalysts in phenol hydroxylation reaction under mild conditions. For instance, usage of hybrid material Cu^{2+}–WP1 (fig. 1) resulted in 99% selectivity on dihydroxybenzenes and 50% conversion at 30°C and ratio of $H_2O:CH_3CN=3:1$ (vol.).
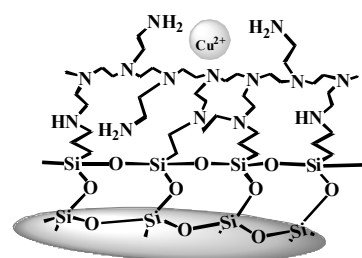
References

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