

Direct Hydroxylation of Benzene over Cu-Exchanged Hydroxy-Sodalite

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1. Introduction – Phenol is considered to be one of the most important intermediate materials for manufacturing of petrochemicals, plastics and agrochemicals¹. A complex cumene process usually performs production of phenol. This process uses a high consumption of energy in addition to equimolar production of acetone as a byproduct². Using H₂, O₂, N₂O or O₂ for direct hydroxylation of benzene into phenol becomes an economic alternative for the processing³.

Hydroxysodalite is considered to be a compact cubic symmetry with Si/Al ratio of 14. The use of Hydroxyl zeolite as catalyst may enhance the diffusion of reactants and products, which can enhance the catalytic activity. Copper is used as a catalyst with different oxidants in the oxidation-reduction reactions⁵. The ion exchanges of copper over HS will result in the presence of copper in a divalent state. The microwave is considered to be an effective alternative, and a lower cost technique for preparation of many materials⁶.

In this work, we will compare the preparation of HS by normal heating with microwave assistance of two sample groups. Furthermore, we studied the stability of both samples for the extent of copper ion exchange. The copper exchanged HS was used as an effective catalyst for direct hydroxylation of benzene into phenol.