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Catalytic conversion of 2-chlorophenol in atmospheric condition using copper incorporated Boroalumino LTA type zeolite

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LTA zeolites are a type of a well-known zeolite structure used in many fields of adsorption, separation and catalytic activity. Zeolites are microporous crystalline structures with anionic TO_4 (T = Al/Si) Frameworks. Their structure comprises linked tetrahedra forming interconnected pores and cages that host cations and adsorbed molecules imparting molecules sieving and catalytic properties. In here, fabricating LTA zeolite framework structure and adjusting framework with the incorporation of hetero-elements by isomorphic substitution alters the zeolite framework giving a vast array of applications by controlling adsorption capacity, thermal stability, catalytic activity and selectivity toward the reactant molecules. Substitution was done by Boron in varying ratios of 0-100% of Al:B. Further modification of these Boro-alumino LTA zeolites with Cu^{2+} ions introduce catalytic activity that creates attractive applications in pollution remediation by catalytic degradation of 2-chlorophenol in atmospheric conditions. Modified zeolites characterized using SEM with EDX mapping, FTIR spectroscopy and Raman spectroscopy to confirm the morphology and cation availability toward the degradation. Identified high crystalline zeolites experimented upon degradation in different temperatures without an oxidizing agent. Main products of degradation are Acetone, methylal, 2- propanol that confirmed degradation undergo Fenton like reaction mechanism in the presence of copper with high efficiency and less cost.

Keywords: Boroalumino zeolites, LTA; Copper, Fenton reaction, Degradation, 2-chlorophenol