

Studies on the Applications of p-TSA Dealuminated Clay Catalyst under Microwave Reactor

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Microwave induced dealumination of montmorillonite clay was carried out by treating the clay with varied concentrations of para toluene sulphonic acid(p-TSA). The resulting clay was characterized by CEC, XRD, FT-IR, TPD and CV techniques. XRD patterns show an unchanged structure of pristine matrix after the acid action. BET analysis revealed an increase in the surface area and pore volume on p-TSA treatment, indicating formation of voids in the octahedral layer which suggests dealumination. CV studies confirm the formation of an Al-p-TSA complex, suggesting dissolution of aluminium octahedral sheets. The complex subsequently hydrolyses, replacing interlayer cations with Al³⁺ ions. Similar treatment with mineral acid resulted in clay with enhanced surface area but with reduced CEC, evidently due to the removal of isomorphously substituted Fe and Mg. p-TSA treated clay showed good catalytic activity for alkylation of p-cresol with cyclohexanol and crossed aldol condensation reactions. The p-TSA treated clays retained their activity even after three subsequent runs and is a potential green catalyst for organic transformations.