Preparation and characterization of the LaFeO$_3$ perovskite crystalline structure catalysts supported on the mesoporous silica for the removal of organic compounds in wastewaters

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Perovskite structured crystalline LaFeO3 catalysts supported on the mesoporous silica were prepared. Modified polymerizable complex method was used as a novel catalyst preparation method. The synthesized catalysts were characterized by N2 adsorption, SAXS, TEM, SEM, ICP‑AES, XRD, TPR and TPD. XRD results showed that the supported LaFeO3 had perovskite‑type crystalline structure with high crystallinity. Catalytic wet oxidation of organic compounds was performed in a batch reactor at ambient pressure and 90℃ using hydrogen peroxide as oxidizing agent. EG (Ethylene Glycol), PVA (polyvinyl alcohol) and phenol were tested as target organic compounds and TOC (Total Organic Carbon) and hydrogen peroxide concentrations in reacting medium were measured. Catalysts synthesized in this study showed over 80% TOC removal efficiencies for each reactants. Experimental results showed that the LaFeO3 on the mesoporous silica catalysts are a promising candidate for the catalytic wet oxidation of refractory organic compounds.