

## Lanthanide-doped mesoporous titania as adsorbents for benzene removal

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Cerium and lanthanum were incorporated into mesoporous  $\text{TiO}_2$  framework by a modified sol-gel method with various metal contents and subsequently, they were utilized as the benzene adsorbents for the treatment of organic pollutant released from indoor air environment. The characteristic of all samples were evidenced by  $\text{N}_2$  sorption isotherms, XRD, SEM, TEM and XPS spectroscopy. In this study, the adsorption behavior of gaseous benzene was promoted remarkably in the presence of active species compared to undoped one.  $\text{Ce}_5\text{TiO}_2$  and  $\text{La}_5\text{TiO}_2$  showed the highest benzene-adsorbed quantities irrespective of reaction temperature. The results attained were suggested due to the alterations in their textural and structural properties corresponding to lanthanide loadings, the provision of more adsorption sites or active sites making them more efficient and the configuration of surface complexes formed. Moreover, at higher temperature, the drastic reduction of adsorption capacities implied that benzene molecules were weakly adsorbed on the adsorbents.