

# Sol-gel synthesis of Kaolin/TiO<sub>2</sub> nanocomposites for adsorption of Zinc and Chromium in Tannery Wastewater

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**Abstract:** In this study, a TiO<sub>2</sub> immobilized on kaolin was synthesized by sol-gel method. The chemical and phase composition, particle morphology and surface area of nanocomposites were investigated using X-ray Diffraction (XRD), Scanning Electron Microscope (SEM) and N<sub>2</sub> adsorption/desorption isotherm. The activity of these nanocomposites was studied in the adsorption of zinc and chromium ions in tannery wastewater. The specific surface area of kaolin/TiO<sub>2</sub> nanocomposites (53.80 m<sup>2</sup>/g) exhibited a significant increase compared to kaolin (17 m<sup>2</sup>/g). The adsorption activities of the nanoadsorbents were found to be depended on the surface area, thus influencing the adsorption properties of the nanocomposites such as rate, efficiency and capacity. Thus, the synthesized kaolin/TiO<sub>2</sub> nanocomposites showed promising technical advantages for wastewater treatment and also paved a way to immobilize other nanoparticles on kaolin.

**Keywords:** Kaolin, sol-gel, nanocomposites, adsorption, surface area, TiO<sub>2</sub>, wastewater treatment