



## Hydroxy-aluminium and cetyltrimethyl ammonium bromide modified bentonite as adsorbent and its adsorption for Orange II

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### ABSTRACT

An inorganic-organic hybrid bentonite-based adsorbent, hydroxy-aluminium and cetyltrimethyl ammonium bromide combined modified bentonite composite (CTAB-Al-Bent), was synthesized and characterized. The adsorption properties and possible mechanism of CTAB-Al-Bent toward anionic dye, Orange II, were investigated. The influences of various experimental parameters, such as contact time, temperature, initial concentration of dye, initial pH and adsorbent dosages on Orange II removal were studied. At the optimal condition: 30 min, 303 K, 50 mg L<sup>-1</sup> Orange II at pH 3.08, 0.02 g/50 mL CTAB-Al-Bent, 88.84% Orange II removal was obtained. Langmuir isotherm and the pseudo-second-order kinetics provided the best correlation with the experimental data. Intra-particle diffusion model showed that adsorption process affected by external mass transfer and diffusion. The excellent adsorption efficiency and reusable performance suggested that CTAB-Al-Bent can act as an excellent adsorbent material for anionic dye wastewater treatment.

*Keywords:* CTAB-Al-Bent; Orange II; Adsorption isotherm; Kinetics; Adsorption mechanism

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