



## Application of modified clays as an adsorbent for the removal of Basic Red 46 and Reactive Yellow 181 from aqueous solution

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### ABSTRACT

The valorization of a low-cost and an abundant material is a significant work for environmental protection. The objective of this work was to investigate the adsorption of two dyes: Basic Red 46 (BR46) and Reactive Yellow 181 (RY181) onto raw (S1) and modified clays. These modifications were carried out by calcination at different temperature (S2, S3, ..., S9), acidic activation, and acetylation. The surface properties of the adsorbents were characterized by the cation exchange capacity, Fourier transform infrared, and X-ray diffraction analyses. Batch studies were performed to evaluate the effect of the contact time and initial dye concentrations on the removal capacities of adsorbents. Among the kinetic models tested, the adsorption kinetics was best described by the pseudo-second-order equation. The isotherm data fitted well with Langmuir model. The maximum adsorption capacities onto the raw clay (S1), calcined clay at 600°C (S5), acidic activated clay (AC), and acetylated clay (MC) were 2.805, 4.232, 1.968, and 2.756 mmol/g for CI Basic Red 46 and 0.031, 0.030, 0.046, and 0.050 mmol/g for CI Reactive Yellow 181, respectively.

*Keywords:* Adsorption; Anionic dye; Cationic dye; Modified clay

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