

## Dye Removal from Aqueous Solution by Regenerated Spent Bleaching Earth

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**Abstract :** Spent bleaching earth (SBE) recycling and utilization as an adsorbent to eliminate dyes from aqueous solution was studied. Organic solvents and subsequent thermal treatment were carried out to recover and reactivate the SBE. The effect of pH, temperature, dye's initial concentration, and contact time on the dye removal using recycled spent bleaching earth (RSBE) was investigated. Recycled SBE showed better removal affinity of cationic than anionic dyes. The maximum removal was achieved at pH 2 and 8 for anionic and cationic dyes, respectively. Kinetic data matched with the pseudo second-order model. The adsorption phenomenon governing this process was identified by the Langmuir and Freundlich isotherms for anionic dye while Freundlich model represented the sorption process for cationic dye. The changes of Gibbs free energy ( $\Delta G^\circ$ ), enthalpy ( $\Delta H^\circ$ ), and entropy ( $\Delta S^\circ$ ) were computed and compared through thermodynamic study for both dyes.

**Keywords :** Spent bleaching earth, reactivation, regeneration, thermal treatment, dye removal, thermodynamic

**Conference Title :** ICCEMT 2019 : International Conference on Chemical Engineering and Materials Technologies

**Conference Location :** Stockholm, Sweden

**Conference Dates :** July 15-16, 2019