Adsorption of crystal violet onto amino silica: optimization, equilibrium, and kinetic studies

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ABSTRACT

Adsorption of crystal violet (CV) onto amino silica (AS) was investigated as a function of parameters including aqueous pH, temperature, AS dose, contact time, agitation speed, and initial CV concentration. And the optimum conditions obtained from response surface methodology (RSM) were temperature 33℃, AS dosage 0.35 g, contact time 64 min, and agitation speed 230 rpm. The adsorption equilibrium using Langmuir and Freundlich models indicated that the process followed Langmuir isotherm and the maximum adsorption capacity reached $40 \, mg \, g^{-1}$. After both pseudo-first-order and pseudo-second-order kinetic models were applied to the experimental data, pseudo-second-order model was found describing the adsorption process very well.

Keywords: Adsorption; Amino silica; Crystal violet; Response surface methodology

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