



Single-step modification of chitosan for toxic cations remediation from aqueous solution

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ABSTRACT

Chitosan was chemically modified with 4-acryloylmorpholine in order to enhance Lewis basic centres in polymeric chain for cations removal. The new material was characterized using elemental analysis, infrared and ¹³C NMR in solid state and was applied for sorption of copper, lead and cadmium from aqueous solutions. The kinetic parameters were evaluated using pseudo-first- and second-order reaction. Kinetic results showed that the sorption process was best described by the pseudo-second-order model. The experimental data were adjusted to the Langmuir, the Freundlich and the Temkin sorption isotherms using both linear and nonlinear regression methods. The material showed the maximum sorption capacity for copper (3.35 mmol g⁻¹), than lead (1.60 mmol g⁻¹) and cadmium (0.74 mmol g⁻¹), obtained through the Langmuir sorption isotherm. The Langmuir model provided the lowest error values and fit better to the experimental data compared with other models.

Keywords: Chitosan; 4-acryloylmorpholine; Sorption; Langmuir; Cations

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