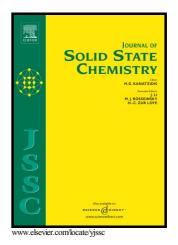
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Highly efficient removal of As(V) from aqueous solutions using a novel octanuclear Zn(II)-based polymer: synthesis, structure, properties and optimization using a response Surface methodology

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### Highly efficient removal of As(V) from aqueous solutions using a novel

#### octanuclear Zn(II)-based polymer: synthesis, structure, properties and

optimization using a response Surface methodology

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#### Abstract

A novel octanuclear Zn(II)-based polymer,  $[Zn_8(BTEC)_2(ATZ)_2(\mu_3-OH)_2(\mu_2-OH)_4(H_2O)_2]_n$ (1), hydrothermally assembled using 5-amino-1-H-tetrazole (HATZ) was with 1,2,4,5-benzenetetracarboxylic acid (H<sub>4</sub>BTEC). Complex 1 was characterized by single-crystal X-ray diffraction and TG. Owing to its unique characteristics, the ability of the  $[Zn_8(BTEC)_2(ATZ)_2(\mu_3-OH)_2(\mu_2-OH)_4(H_2O)_2]_n$  to remove As(V) from aqueous solutions was investigated (The form of As(V) is  $AsO_4^{3-}$ ). A series of experimental conditions of adsorption were studied, which included the pH value, contact time, adsorbent dose, adsorption temperature, initial concentration and shaking speed. The experimental results showed that complex 1 had a higher stable and relatively high (>98%) As(V) removal rate at pH 7–11. The adsorption process fitted well to the Langmuir model and the pseudo-second-order kinetic model. And the optimal adsorption conditions were also examined using a Box-Behnken design response surface methodology. In addition, complex 1 was further characterized by elemental analysis (CHN), photoluminescence(PL), XRD, IR spectroscopy before and after adsorption As (V).

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