

عنوان مقاله:

Design and construction of a novel solid optical sensor for simultaneous detection and removal of Pb(II) ions based on dithizone anchored on mesoporous SBA- 15

محل انتشار:

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خلاصه مقاله:

In this work, design of a novel solid optical sensor for single-step detection and removal of Pb(II) ions based on dithizone (DZ) anchored on mesoporous SBA-15 with rapid colorimetric response and high selectivity for the first time was reported. Central composite design (CCD) was applied to evaluate the interactive effects of adsorption variables such as pH value, mesoporous SBA-15 dose, contact time and initial concentration, and also, the optimum experimental conditions were found with desirability function (DF) combined CCD. This solid optical sensor exhibits a linear range of 1.0 to 100 $\mu\text{g mL}^{-1}$ of the Pb(II) ion concentration with a detection limit of 0.07 $\mu\text{g mL}^{-1}$. This solid optical sensor was applied to the determination and removal of Pb(II) in spiked sample. Various isotherm models for fitting the experimental equilibrium data were studied and Langmuir model was chosen as an efficient model. And also, various kinetic models for analysis of experimental adsorption data were studied and pseudo second order model was chosen as an efficient model.

کلمات کلیدی:

Solid optical sensor; Pb(II) ions; Central Composite Design; Mesoporous SBA- 15; Desirability function

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