

Synthesis and characterization of immobilized 1-(1,3-diphenyl-5-hydroxy-1H-pyrazol-4-yl)ethanone on silica gel and its use for aqueous heavy metal removal

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ABSTRACT

A novel, alternative and efficient organic-inorganic hybrid was synthesized by immobilizing 1-(1,3-diphenyl-5-hydroxy-1H-pyrazol-4-yl)ethanone on silica gel, previously modified with 3-aminopropyltrimethoxysilane. This novel material was well characterized by fourier transform infrared spectroscopy, ²⁹Si and ¹³C cross-polarization magic-angle-spinning solid-state nuclear magnetic resonance, scanning electron microscopy, Brunauer–Emmett–Teller surface area, X-ray diffraction and elemental analysis. Thermal stability of the material was determined by thermogravimetry curves (TGA). This new chelating agent effectively removed Lead ions Pb(II) from the aqueous solution and showed very high adsorption capacity (q_e (mg/g) up to 120.83 mg/g for hyper toxic Pb(II) ions.

Keywords: Modified silica gel; Pyrazolone; Adsorption; Pb(II); Kinetics; Thermodynamics; Isotherms

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