Chemosynthesis and structural characterization of a novel lignin-based bio-sorbent and its strong adsorption for Pb (II)

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Industrial Crops and Products

DOI:
10.1016/j.indcrop.2017.06.013

Published: 01/12/2017

Peer reviewed version

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Figure Captions

Scheme 1. Synthesis diagram of lignin-based adsorbent.

Fig. 1. $^{31}$P-NMR spectra of the L and PL. Abbreviations: CS, condensed syringyl phenolic hydroxyls; S, non-condensed syringyl phenolic hydroxyls; CG, condensed guaiacyl phenolic hydroxyls; G, non-condensed guaiacyl phenolic hydroxyls; H, p-hydroxybenzoate phenolic hydroxyls; COOH, carboxylic groups.

Fig. 2. $^1$H NMR spectra of the lignins.

Fig. 3. The $^{13}$C NMR spectra of the lignins.

Fig. 4. The effect of the pH on the adsorption capacity (a) and the zeta of SAPL-1.5 (b).

Fig. 5. The effect of SAPL-1.5 dosages on the adsorption capacity and removal efficiency.

Fig. 6. The effect of initial Pb (II) concentration on the adsorption capacity and removal efficiency (a), and the Langmuir and Freundlich isotherm models investigated (b).

Fig. 7. The effect of contact time on the adsorption capacity (a), and the Langmuir and Freundlich isotherm models investigated (b).
Scheme 1
Fig. 1.
Fig. 2.
Fig. 3.
Fig. 4.
Fig. 5.
Fig. 6.
Fig. 7.