

Structural Variation of Lignin and Lignin–Carbohydrate Complex in Eucalyptus grandis × E. urophylla during Its Growth Process

Zhao, Bao-Cheng; Chen, Bo-Yang; Yang, Sheng; Yuan, Tong-Qi; Charlton, Adam; Sun, Run-Cang

## **ACS Sustainable Chemistry & Engineering**

DOI: 10.1021/acssuschemeng.6b02396

Published: 01/01/2017

Peer reviewed version

Cyswllt i'r cyhoeddiad / Link to publication

Dyfyniad o'r fersiwn a gyhoeddwyd / Citation for published version (APA): Zhao, B.-C., Chen, B.-Y., Yang, S., Yuan, T.-Q., Charlton, A., & Sun, R.-C. (2017). Structural Variation of Lignin and Lignin–Carbohydrate Complex in Eucalyptus grandis × E. urophylla during Its Growth Process. ACS Sustainable Chemistry & Engineering, 5(1), 1113-1122. https://doi.org/10.1021/acssuschemeng.6b02396

Hawliau Cyffredinol / General rights Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

• Users may download and print one copy of any publication from the public portal for the purpose of private study or research.

- · You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

Take down policy If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

## **Figure Captions**

Scheme 1. Synthesis diagram of lignin-based adsorbent.

- **Fig. 1.** <sup>31</sup>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. <sup>1</sup>H NMR spectra of the lignins.
- Fig. 3. The <sup>13</sup>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 contract 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.