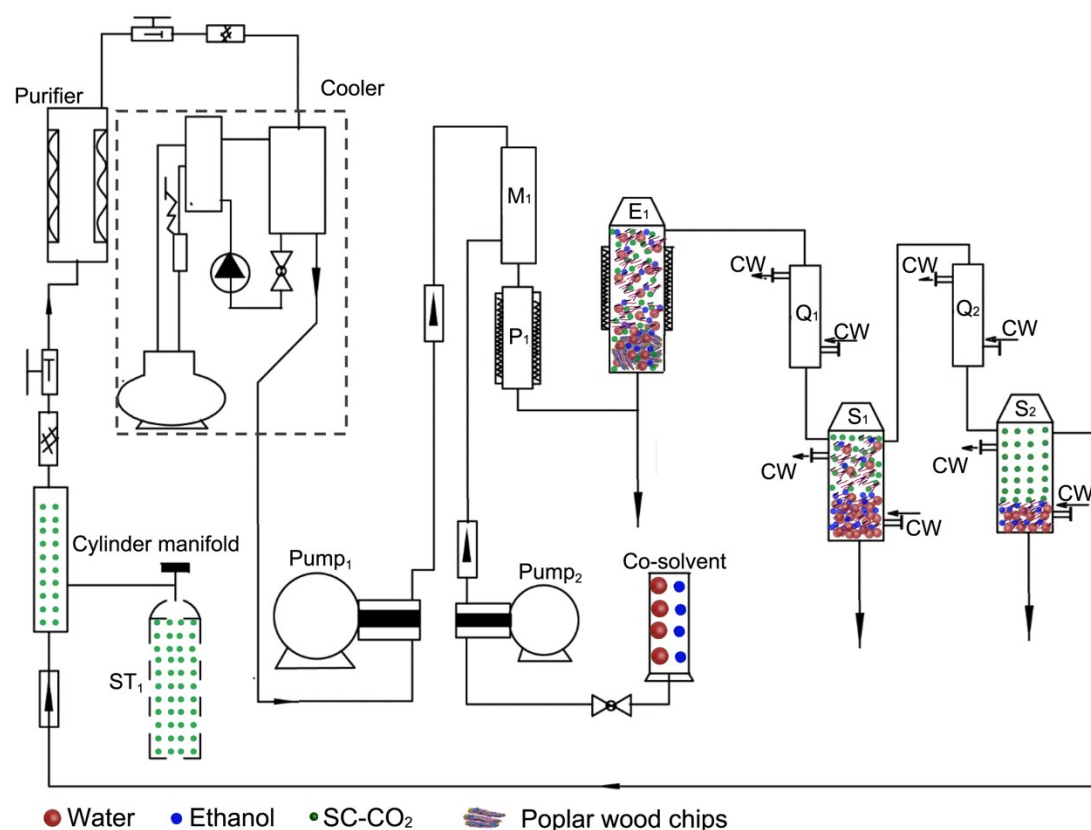


## Supporting Information (SI)

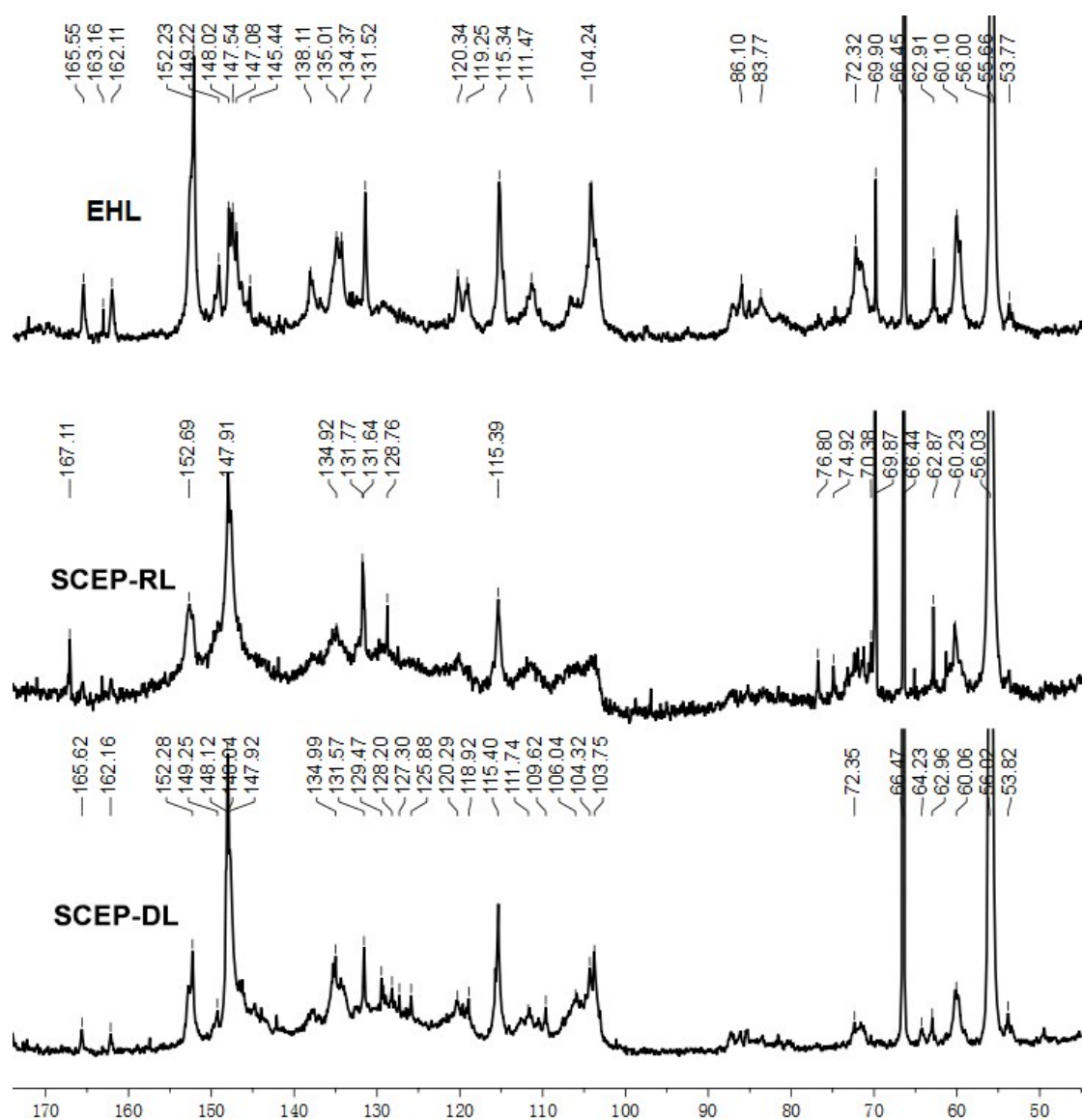
### Structural changes of poplar wood lignin after supercritical pretreatment using carbon dioxide and ethanol-water as co-solvents

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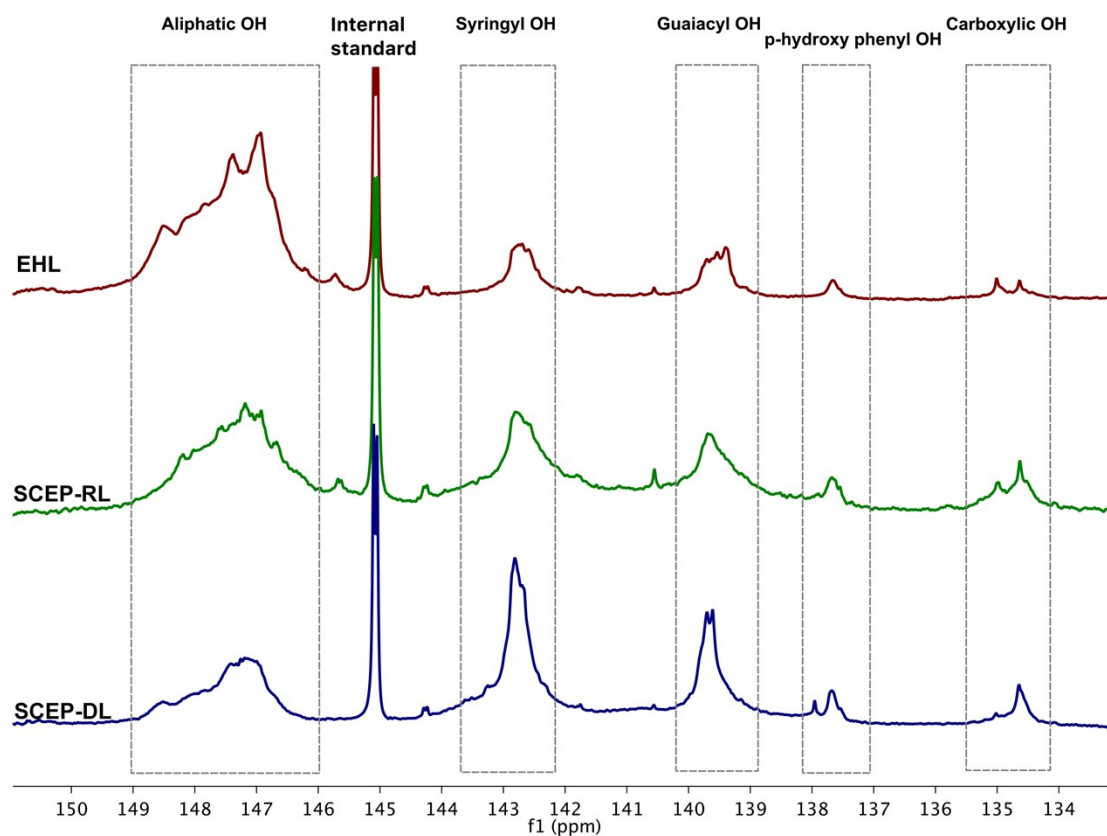
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**Fig.S1.** Supercritical CO<sub>2</sub> pretreatment with the ethanol-water as co-solvents (SCEP) device scheme: (E<sub>1</sub>) reaction vessel; (S<sub>1</sub>, S<sub>2</sub>) separators; (M<sub>1</sub>) mixers; (P<sub>1</sub>) preheater; (Q<sub>1</sub>, Q<sub>2</sub>) quencher; (CW) cooling water.



**Fig.S2.** Quantitative  $^{13}\text{C}$ -NMR spectra of supercritical carbon dioxide pretreatment dissolution lignin (SCP-DL), enzymatic hydrolysis of original lignin (EHL), and supercritical carbon dioxide pretreatment residual lignin (SCP-RL).



**Fig. S3.** Quantitative  $^{31}\text{P}$ -NMR spectrum of EHL, SCEP-RL and SCEP-DL derivatized with tmdp using cyclohexanol as internal standard.