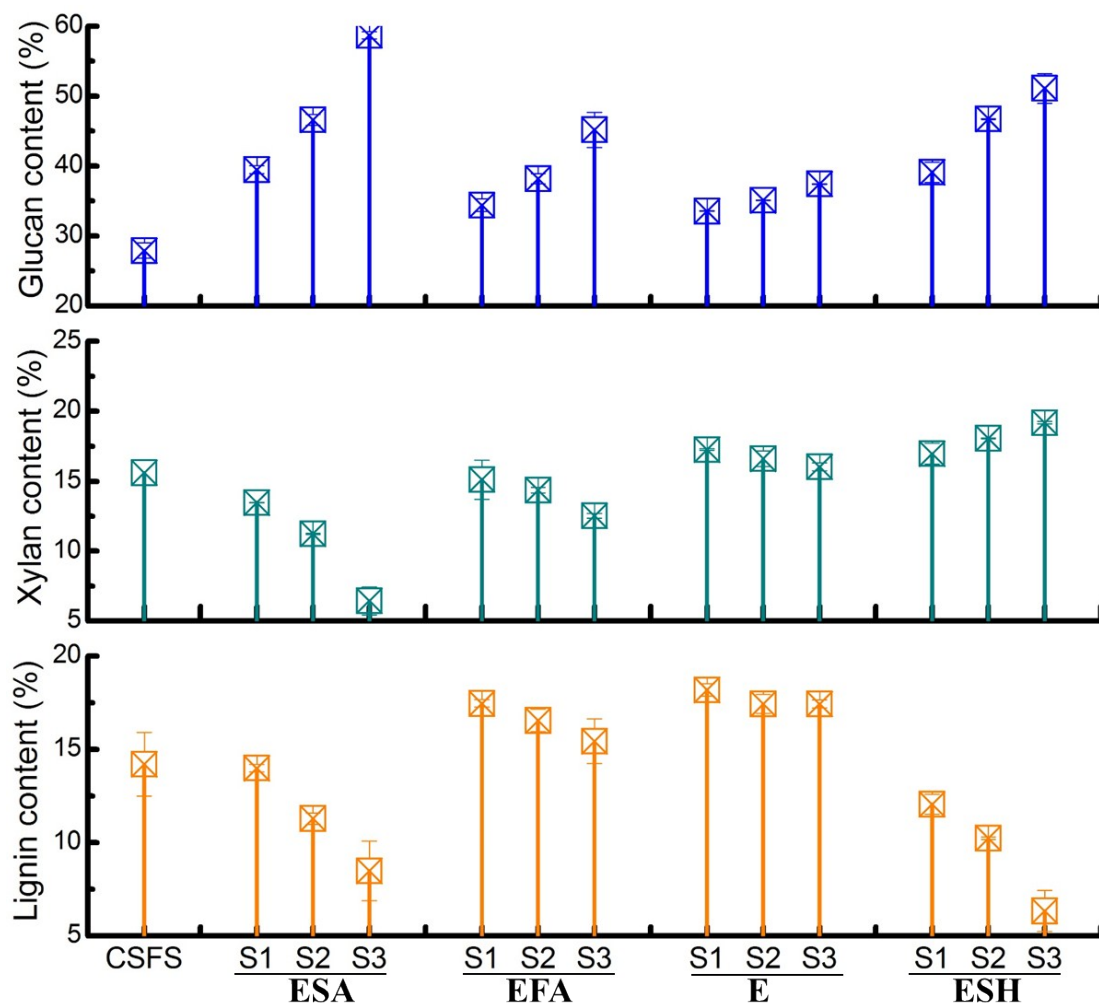
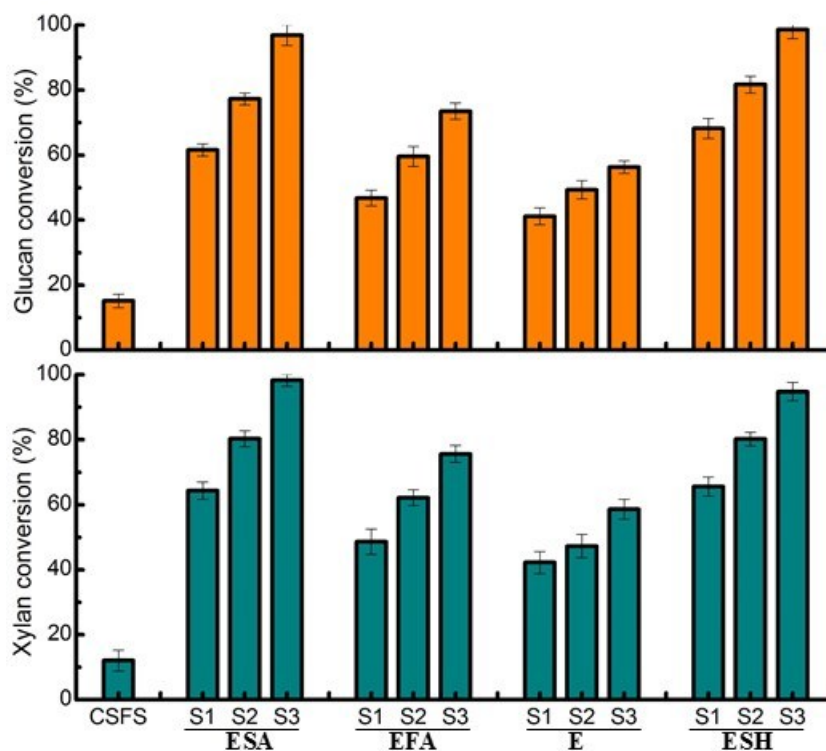


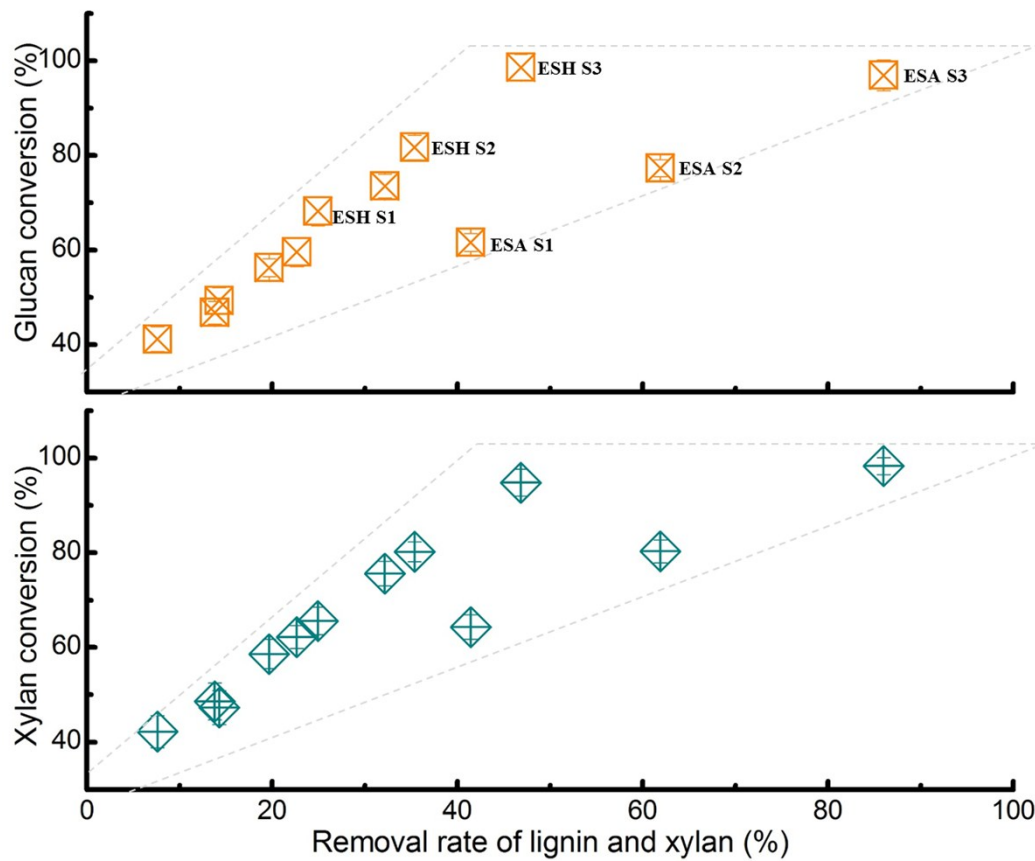
Electronic supplemental information A Component transformation in corn stover solid fraction by sequential organosolv fragmentation approach (SOFA). Fragmentation approaches were described in Table 1. CSFS stands for corn stover feedstock. ESA represents ethanol plus sulfuric acid; EFA represents ethanol plus formic acid; ESH represents ethanol plus sodium hydroxide. S1, S2 and S3 represent stage 1, stage 2 and stage 3, respectively



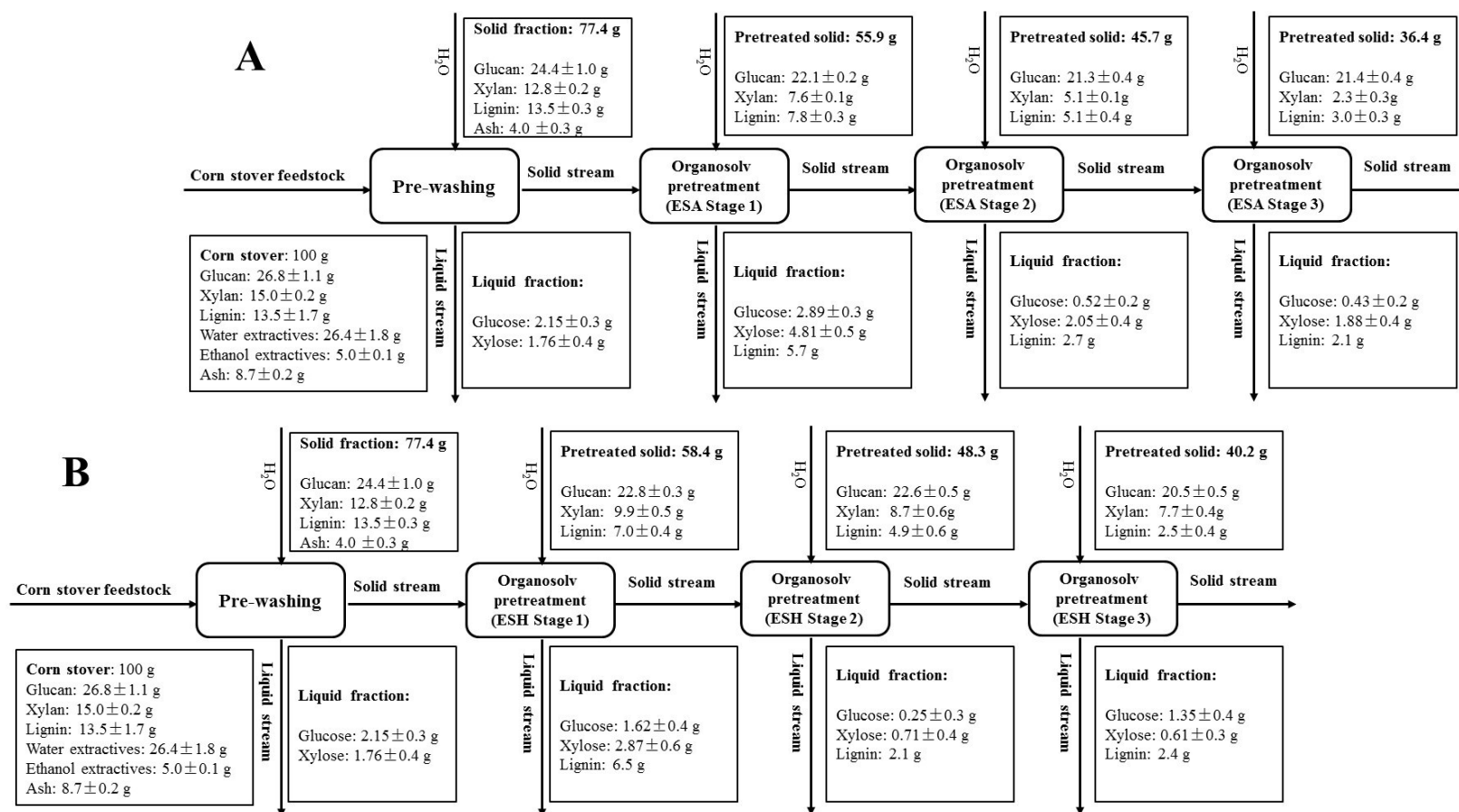
Electronic supplemental information B Enzymatic hydrolysis of pretreated solids by sequential organosolv fragmentation approach (SOFA). Fragmentation approaches are described in Table 1. CSFS stands for corn stover feedstock. ESA represents ethanol plus sulfuric acid; EFA represents ethanol plus formic acid; ESH represents ethanol plus sodium hydroxide. S1, S2 and S3 represent stage 1, stage 2 and stage 3, respectively



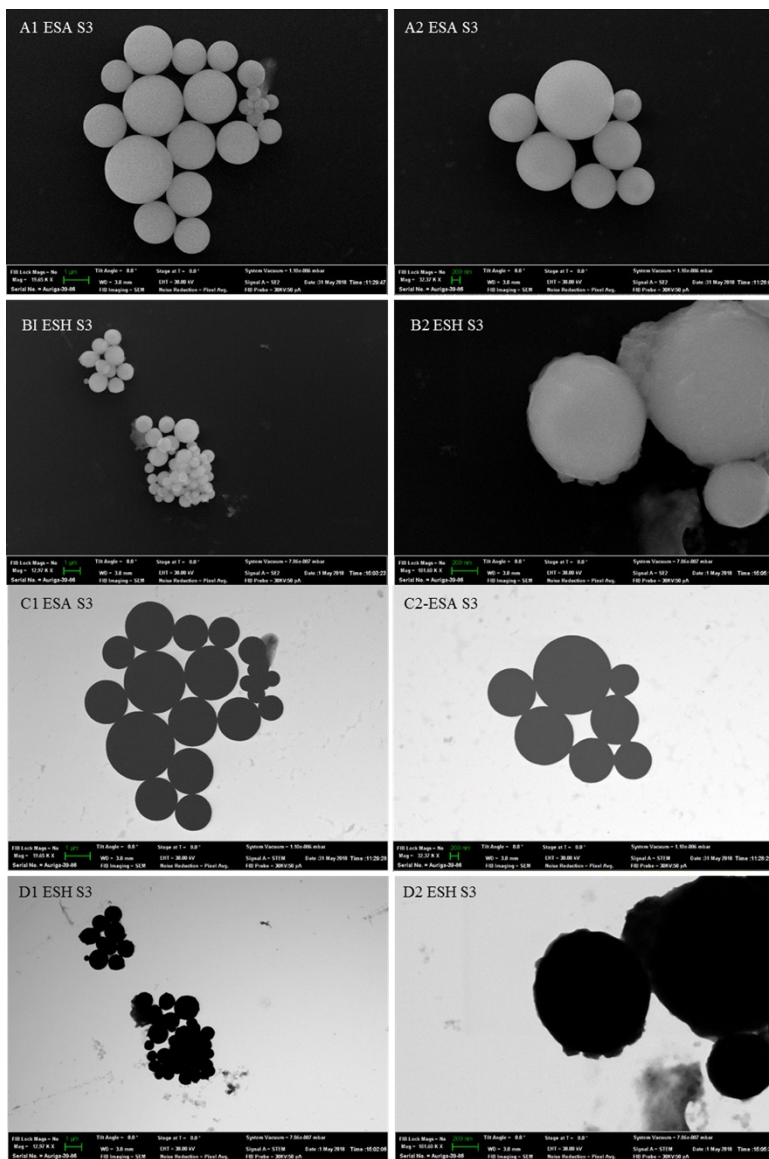
Electronic supplemental information C Correlations between the glucan/xylan conversion and removal rates of xylan and lignin. ESA represents ethanol plus sulfuric acid; EFA represents ethanol plus formic acid; ESH represents ethanol plus sodium hydroxide. S1, S2 and S3 represent stage 1, stage 2 and stage 3, respectively

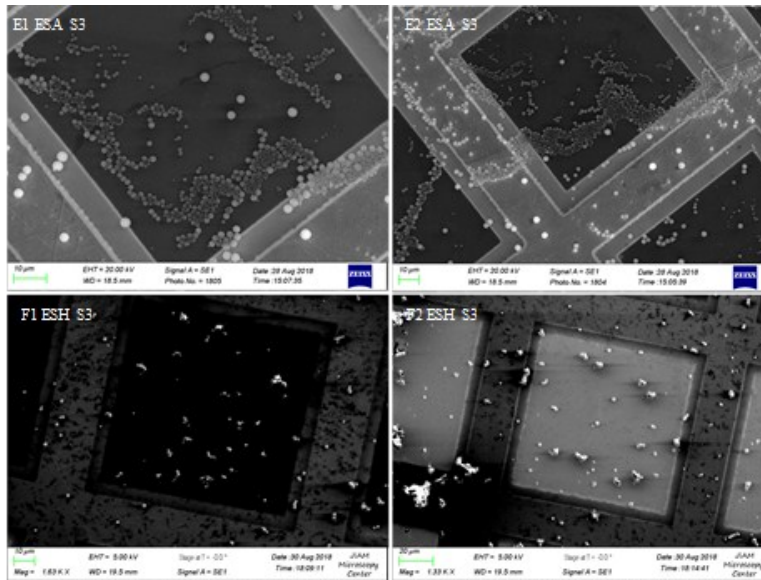


Electronic supplemental information D Mass balance of the whole sequential organosolv fragmentation approach (SOFA). A, SOFA using ethanol plus sulfuric acid (ESA); B, SOFA using ethanol plus sodium hydroxide (ESH). S1, S2 and S3 represent stage 1, 2 and 3, respectively

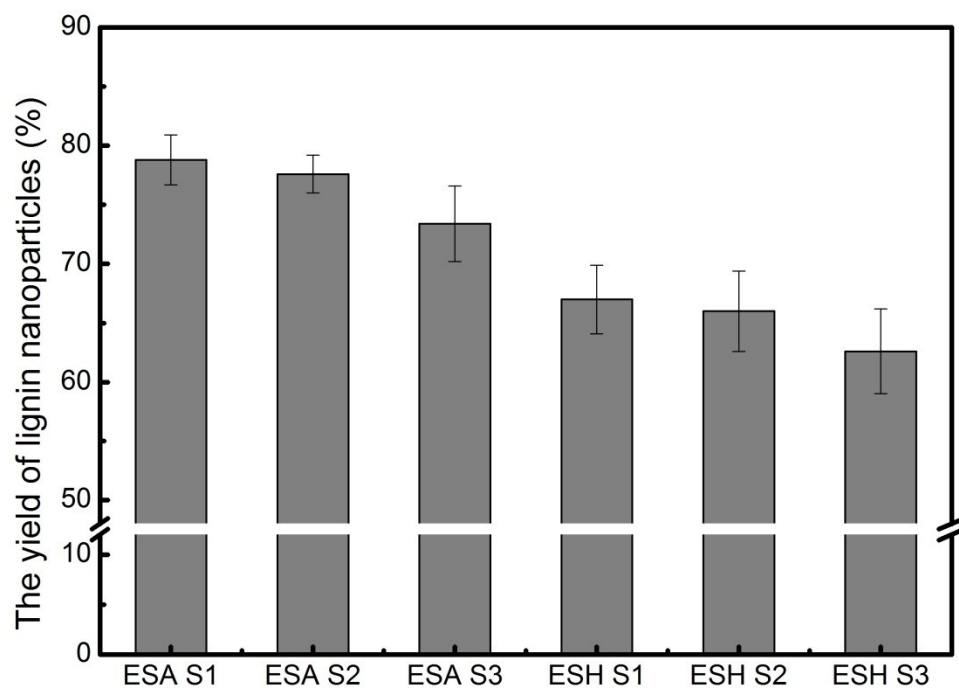


Electronic supplemental information E Scanning electron microscopy (SEM) (A, B, E, F) and scanning transmission electron microscopy (STEM) (C, D) images of lignin nanoparticles (LNPs) fabricated from lignin produced by sequential organosolv fragmentation approach (SOFA). ESA represents ethanol plus sulfuric acid; ESH represents ethanol plus sodium hydroxide. S1, S2 and S3 represent stage 1, stage 2 and stage 3, respectively

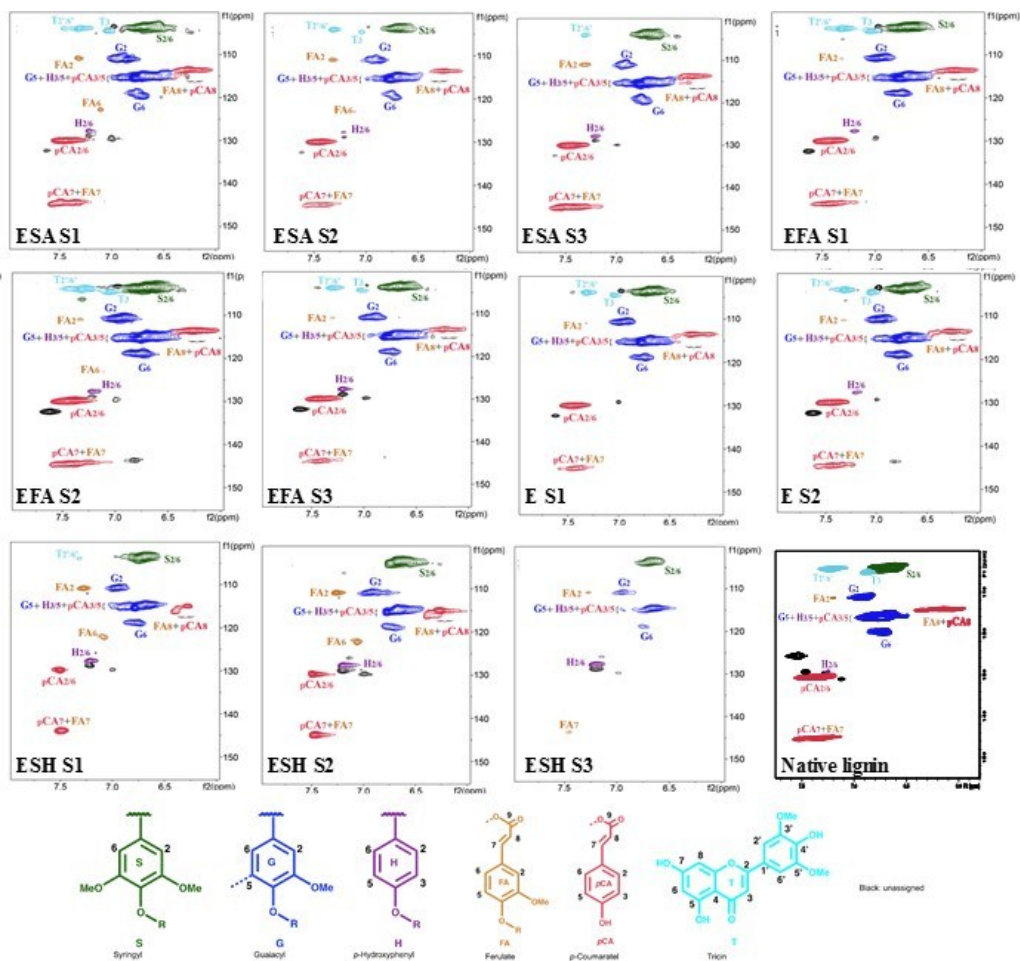




**Electronic supplemental information F** The yield of lignin nanoparticles (LNPs) fabricated from lignin produced at each stage of sequential organosolv fragmentation approach (SOFA). ESA represents ethanol plus sulfuric acid; ESH represents ethanol plus sodium hydroxide. S1, S2 and S3 represent stage 1, stage 2 and stage 3, respectively.

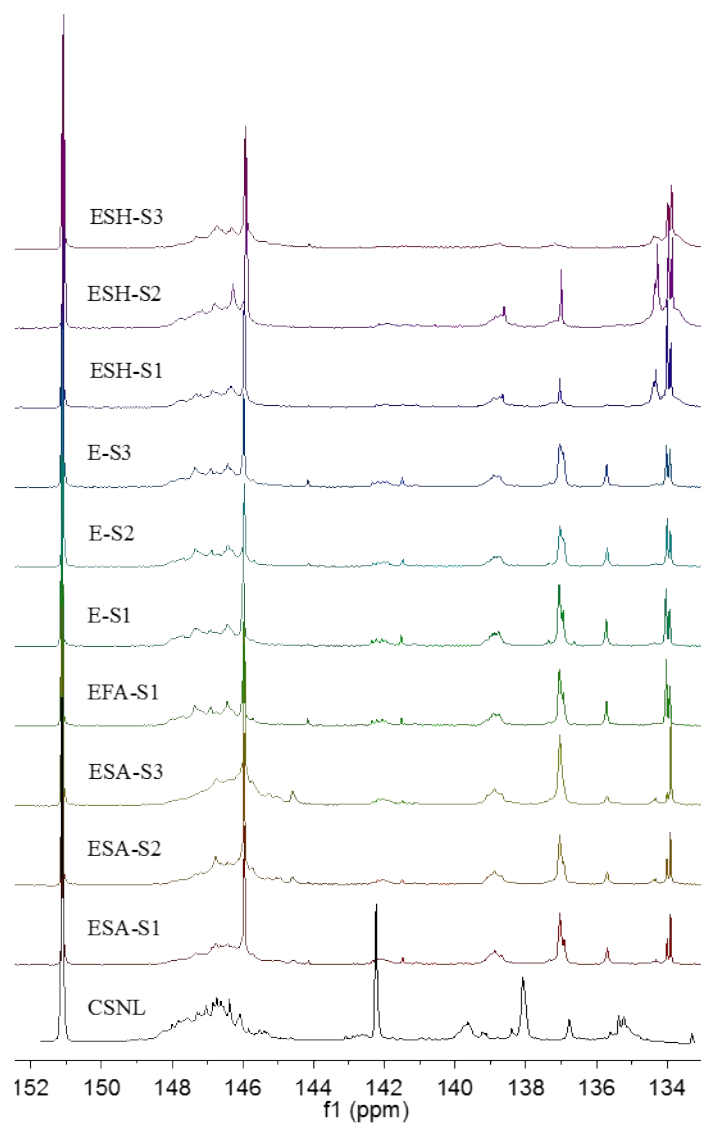


Electronic supplemental information G [Aromatic regions](#) of 2D HSQC NMR spectra from the fractionated lignin produced from each sequential organosolv fragmentation approach (SOFA). ESA represents ethanol plus sulfuric acid; EFA represents ethanol plus formic acid; ESH represents ethanol plus sodium hydroxide. S1, S2 and S3 represent stage 1, stage 2 and stage 3, respectively





Electronic supplemental information  $^1\text{H}$   $^{31}\text{P}$ -NMR spectra of the fractionated lignin produced from each sequential organosolv fragmentation approach (SOFA). ESA represents ethanol plus sulfuric acid; EFA represents ethanol plus formic acid; ESH represents ethanol plus sodium hydroxide. S1, S2 and S3 represent stage 1, stage 2 and stage 3, respectively



Electronic supplemental information I A proposed mechanism model of the self-assembly fabrication of lignin nanoparticles (LNPs) from corn stover lignin produced by sequential organosolv fragmentation approach (SOFA). ESA represents ethanol with sulfuric acid; ESH represents ethanol with sodium hydroxide. S1, S2 and S3 represent stage 1, stage 2 and stage 3, respectively. A-OH represents aliphatic hydroxyl group; P-OH represents phenolic hydroxyl group; CL represents condensed lignin; '+' represents an increase; and '-' represents a decrease.

