Supporting Information Swern Manuscript

Figure S1: $^1$H NMR of model compound 8
Figure S2: $^{13}$C NMR of model compound 8
Figure S3: $^1$H NMR of model compound 6
Figure S4: $^{13}$C NMR of model compound 6
Figure S5: $^{13}$C NMR spectrum of compound 1′
Figure S6: $^1$H NMR spectrum of compound 1'
Figure S7: $^{13}$C NMR spectrum of compound $2'$
Figure S8: $^1$H NMR spectrum of compound 2'
Figure S9: $^{13}$C NMR spectrum of compound 3'
Figure S10: $^{1}$H NMR spectrum of compound 3'}
Figure S11: $^{13}$C NMR spectrum of compound 4'
Figure S12: $^1$H NMR spectrum of compound 4'
Figure S13: $^{13}$C NMR spectrum of compound 5'
Figure S14: $^1$H NMR spectrum of compound 5'
Figure S15: $^1$H NMR spectrum of compound 6' produced via Swern oxidation of compound 6
Figure S16: $^{13}$C NMR spectrum of compound 6' produced *via* Swern oxidation of compound 6.
Figure S17: $^1$H NMR spectrum of compound 6' produced via Parikh-Doering oxidation of compound 6
Figure S18: $^{13}$C NMR spectrum of compound 6' produced via Parikh-Doering oxidation of compound 6

Peak at 163 ppm (noted with *) a glitch as evidenced by digital resolution
Figure S19: $^{31}\text{P}$ NMR of Kraft lignin (bottom, blue) and Swern oxidized Kraft Lignin (top, red).

<table>
<thead>
<tr>
<th></th>
<th>Aliphatic-OH (mmol/g lignin)</th>
<th>S-Phenol (mmol/g lignin)</th>
<th>G-Phenol (mmol/g lignin)</th>
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</thead>
<tbody>
<tr>
<td>Kraft Lignin</td>
<td>2.87</td>
<td>1.51</td>
<td>3.75</td>
</tr>
<tr>
<td>Swern Oxidized</td>
<td>0.23</td>
<td>1.63</td>
<td>0.89</td>
</tr>
<tr>
<td>Kraft Lignin</td>
<td></td>
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$^{31}$P NMR measurements were performed on a Varian Inova 400 MHz Spectrometer. 2-Chloro-4,4,5,5-tetramethyl-1,3,2-dioxaphospholane was procured from Sigma Aldrich. PW90 and T1 values were measured for each sample prior to analysis. The observation pulse was 90° at 6.8 μs for Kraft lignin and 6.69 μs for Swern oxidized lignin. T1 was calibrated at 3.2 s for Kraft lignin and 4.233 s for Swern oxidized lignin. In all cases the delay was set to 5 times the measured T1 value and 1020 scans were recorded. Samples were prepared in a similar method to Ragauskas\textsuperscript{1} in which 20 mg of lignin was added to a vial. Then 100 microliters of a 0.1 N solution of N-Hydroxy-5-norbornene-2,3-dicarboxylic acid imide (internal standard), followed by 100 microliters of 0.01 N solution of chromium (III) acetylacetonate, were added. Lastly 50 microliters of phosphitylating reagent and 750 microliters of 1.6/1 v/v mixture of pyridine/CDCl\textsubscript{3} were added. The resulting mixture was then capped and heated and sonicated until dissolved. All solutions were made in a 1.6/1 v/v mixture of pyridine/CDCl\textsubscript{3}. In the case of Swern oxidized lignin dissolution was nearly complete after two days (See Figure S20). Data was baseline corrected with a 4\textsuperscript{th} order polynomial fit using ACD/NMR Processor Academic Edition software.
Figure S20: Dissolution of Swern oxidized Kraft Lignin (Indulin AT Lignin) for $^{31}$P NMR analysis.
Figure S21: $^1$H NMR of Kraft lignin, Swern oxidized Kraft lignin, Parikh-Doering oxidized Kraft Lignin
Figure S22: FT-IR spectrum of compound 3'
Figure S23: FT-IR spectrum of compound 5’
References: