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LICENSING OPPORTUNITIES

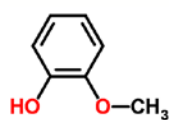
South Dakota School of Mines
Office of Economic
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opportunities. Joint
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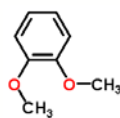
South Dakota School of Mines &
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501 E. St Joseph Street
Rapid City, SD 57701

Description:

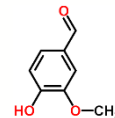
This invention describes the selective synthesis of high-value chemical products, especially phenol derivatives that can be further used for production of polymers, composites, etc. The top-value added chemicals-phenolic compounds, such as those presented in Figure 1, can be produced by the disclosed approach from organic products (e.g. oil and oil derivatives) and biomass and biomass derivatives, (e.g. including but not limited to cellulose, sea-weed, grass-weed, switch grass, hey, manure, wood chips, corn etc.) and products of pulp and paper industry (e.g. lignin).



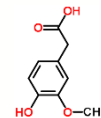
Guaiacol



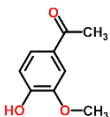
Methylguaiacol



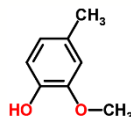
Vanillin



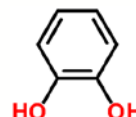
Homovanillic Acid



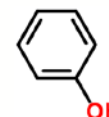
Apocynin



Creosol



Catechol



Phenol

Figure 1: Major compounds identified from the organic fraction of liquefied lignin.

Advantages

- High conversion efficiency in comparison to the hydrothermal reforming in presence of air or nitrogen
- Fast process that can be performed in a flow-through reactor in a matter of minutes
- Environmentally friendly approach that does not require additional procedures, e.g. removal of the catalyst
- Easily scalable from laboratory prototype to the industrial level
- Absence of tar formation and repolymerization
- Energy intensity is relatively low- economically viable.