

Higher value from lignins by tuneable depolymerisation

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Lignin is a promising bio-based feedstock for diverse applications, including aromatic chemicals, resins, coatings and transportation fuels. VTT Technical Research Centre of Finland has developed a tuneable lignin depolymerisation process to produce low molecular weight fragments, oligomers and monophenols, enabling valorisation of lignin in a wide variety of applications. The process can convert lignin into oligomers with controllable properties, including molecular weight, functionalities and solubility. This enables tuning the catalytic depolymerisation process towards the targeted application. Alternatively, alkylphenols can be produced in over 40 wt% yields, presenting a highly attractive approach to produce bio-based chemicals or fuels. VTT's technology benefits from a slurry-phase process, which enables utilising all the lignin for the depolymerisation. Furthermore, proprietary non-noble metal catalysts reduce the cost of the process. By leveraging renewable feedstocks and employing advanced catalytic methods, our process aims to reduce the carbon footprint and dependency on fossil resources while also ensuring economic viability and scalability.

References:

1. Silja Känsäkoski *et al.* Depolymerisation of γ -Valerolactone Organosolv Lignins with Unsupported Molybdenum-based Catalysts, ChemSusChem 2026, e202500643; <https://doi.org/10.1002/cssc.202500643>.