

Aqueous-phase hydrodeoxygenation of
bio-derived phenols on Ru clusters

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The catalytic deoxygenation of phenolic compounds has become a major area of interest in recent years because they are produced during the pyrolysis of lignin and are present in biofuels. Hydrodeoxygenation (HDO) of lignin monomers requires the initial hydrogen insertions into unsaturated aromatic ring to weaken the C–O linkages, which followed by successive desired C–O cleavage and undesired further hydrogen-insertions that occurs in parallel. The catalytic pathways for lignin–monomer HDO have been reported, but the generalized reaction pathway and mechanistic interpretation among these typical lignin monomers have not been established.

The purpose of this study was to generalize the reaction pathways for lignin–monomers (phenol, anisole, catechol, and guaiacol) during HDO in aqueous phase with hydrogen of these model compounds on nano-sized Ru clusters.