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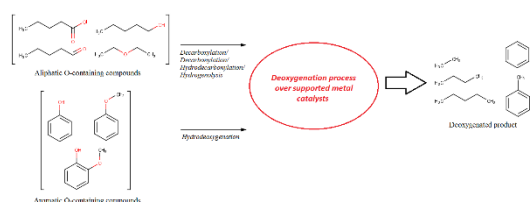
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Graphical Abstract



Abstract

Catalytic deoxygenation is a fundamental process for bio-oil upgrading due to its high oxygen content which will result in lower heating value, corrosion and instability issues. The discovery of an excellent heterogeneous deoxygenation metal catalyst with high deoxygenation activity is a necessary breakthrough for an optimized bio-oil catalytic deoxygenation. For an effective deoxygenation supported metal catalyst, properties such as high H₂ sticking coefficient, optimal metal-oxygen bond strength and suitable acid strength from support are needed to ensure facile scission of C—O bonds and activation of H₂ and O-containing compounds. Metals such as Fe, Ru, Sn, W, Zr and supports such as C, TiO₂, ZrO₂ which are oxophilic were also observed to enhance direct removal of oxygen from O-containing compounds due to their high C—O and

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