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Lignin Biorefinery

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6 - Chemo-catalytic conversion of lignin

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Abstract

This chapter explains catalytic chemical methods of lignin transformation which include acid-catalyzed, base-catalyzed and metal-catalyzed methods. The chapter starts with a brief discussion of the lignin architecture as a background to understanding the subsequent subject of lignin's chemo-catalytic depolymerization methods. The general idea that lignin depolymerization involves the cleavage of the linkages holding its basic aromatic-based [monomers](#) is discussed. Under each of the catalytic methods, the concept is first explained starting with the types of acid, base, or metal (as the case may be) employed, followed by the reaction conditions and then the reaction mechanism involved in method under discussion. Current research efforts are incorporated into each of the sections, as obtained from recent reviews. Under the metal-catalyzed method, reductive and oxidative lignin depolymerization methods are explained. Extant challenges faced by lignin researchers are mentioned in the texts. A typical laboratory procedure for lignin depolymerization using the stainless steel autoclave is described, and the chapter ends with the future of lignin as a viable energy source and substitute for petroleum in the manufacture of chemicals and fuels.

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Keywords

Lignin depolymerization

Chemo-catalytic lignin conversion

Acid-catalyzed lignin depolymerization

Base-catalyzed lignin depolymerization

Metal-catalyzed lignin depolymerization

Oxidative lignin depolymerization

Reductive lignin depolymerization

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