

**Bimetallic nanoparticles for the valorization of biomass. The role of the stabilizer.**

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In the outlook of the replacement of petrochemicals by biomass-derived chemicals, lignin, a polymer present in the plants cell wall, is the most promising source of aromatic compounds. However, its extraction and valorization are not straightforward. Lignin, which provides the structure of plants and protects them from external aggression, is a resistant polymer that is challenging to break down. There is a need to discover efficient and selective catalysts for this purpose. Lignin is mainly bonded by diaryl ether and  $\beta$  aryl ether linkages. Among the different reactions able to cleave these carbon oxygen bonds, reductive cleavage using hydrogen gas is the most appealing. In this perspective, bimetallic nanoparticles<sup>[1]</sup> coated with different cetyl trimethyl ammonium salts in water were assessed. Initial studies were made on a model compound that mimic the diaryl ether bonding motifs (diphenyl ether). The nanoparticles coated with the salts with anions of low-nucleophilicity exhibit higher catalytic activities. The efficiency of the bimetallic nanoparticle on real biomass (beech wood sawdust, dealkaline lignin and organosolv lignin) were also evaluated.

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