

Lignin utilisation – why is it still such a challenge ?

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As we all know, lignin is the most common renewable aromatic biopolymer. In various industrial conversion processes, it is inevitably accumulated in large quantities and in a chemically modified form, as "technical lignin". The discrepancy between large-scale technical availability and the still very limited real usage has triggered and challenged academic and industrial research for more than a hundred years - with varying intensity and success. The intensity of research has once again increased significantly in recent years, but the implementation of the undoubtedly existing, practicable ideas and their large-scale application has been much slower. Is this realization too much to ask for? Are we not yet able to fully understand and use technical lignins like we do with cellulose (or even crude oil)?

This paper briefly summarizes the current status of lignin use. It tries to answer the question why even detailed structural knowledge cannot readily be translated into guidelines for lignin utilization and will not automatically result in applications, leading to the core question of structure-property-application relationships. To overcome the obvious bottleneck, we need to steer research in different directions and combine research efforts: thorough analytical characterization and high-throughput techniques that allow rapid screening or clustering together with application testing are of central importance. The latter is often not easy for a large number of samples, but it is necessary to obtain the required statistical confidence for fast chemometry-based methods.