Wood as resource for wood coatings and adhesives

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The Fraunhofer Institute for Wood Research, Wilhelm-Klauditz-Institut WKI, uses wood not only as a material for wood-based materials but also as a raw material for bio-based polymers. This is because wood essentially consists of three polymeric structures: cellulose, hemicellulose and lignin. These three components can be converted into bio-based polymers as binding agents for coatings, adhesives, plastics and printing inks. Some exemplary projects show which binders we have developed from these wood components for wood applications:

Cellulose is a high molecular weight, linear polymer consisting of linked glucose monomers. The focus of research has shifted to nanocellulose as a new, promising material for a wide range of applications. Our research is focused on modified nanocellulose for wood fire protection coatings. Hemicellulose, on the other hand, is a low-molecular polymer consisting of pentose and hexose sugar monomers. We have processed these sugar monomers into sugar-acrylate binders for wood coatings and wood adhesives. Lignin, a natural macromolecule that occurs annually in large quantities as a waste product of the paper and pulp industry, is also suitable as a component of adhesives and coating systems due to its phenolic and highly cross-linked structure. Due to its chemical structure, lignin has some useful properties, which we have used to develop wood adhesives, binders for printing inks and fire protection coatings.