

Cellulose breakdown

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Ionic liquids have emerged as promising new solvents capable of disrupting the cellulose crystalline structure in a wide range of biomass feedstocks.

Such biomass is of particular interest as a renewable and sustainable source of fuels and chemicals, and the crystallinity of the cellulose is one of the major obstacles to fermentation and yields.

Researchers at ORNL pretreated four different feedstocks -- microcrystalline cellulose (Avicel), switchgrass, pine, and eucalyptus -- with an ionic liquid and found such pretreatment results in a loss of cellulose crystalline structure and the transition of the feedstock surface from cellulose I to the more readily digested cellulose II.

The impact of the pretreatment on the structure was analyzed by [X-ray diffraction](#). The impact on the surface roughness was determined by small-angle neutron scattering, using the General Purpose SANS instrument at the [High Flux Isotope Reactor](#) at ORNL.

Researchers believe the results for some samples suggest another factor, likely lignin-carbohydrate complexes, also impacts cellulose breakdown.

Provided by Oak Ridge National Laboratory

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