

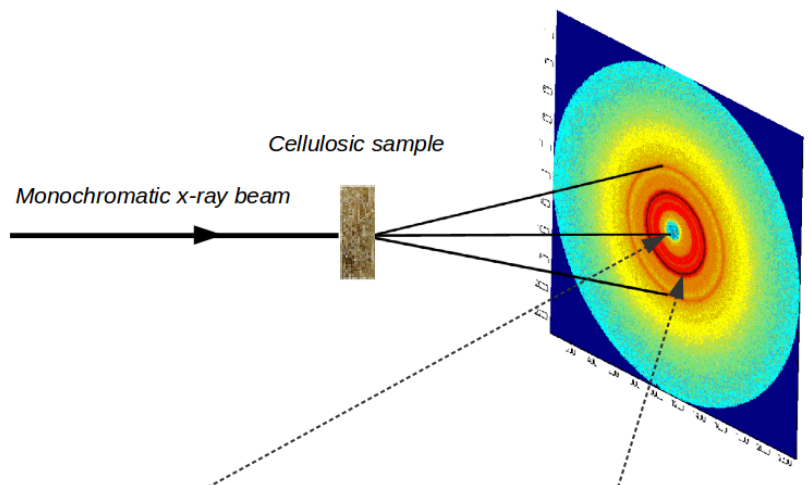
**Structural investigations of cellulosic materials using x-ray
and neutron scattering**

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Related mission: Mission 1 (Assessment and remediation of the
Humanosphere)
Mission 2 (Development of Science and Technology through
Biomass and Solar Power Satellite Research toward a
Solar Energy Society)

Abstract

X-ray and neutron scattering methods are able to provide information on the structure of lignocelluloses on a wide range of length scales. Wide-angle x-ray scattering (WAXS) can be used to study the crystalline proportion of cellulose, yielding parameters such as crystal size, crystallinity, and fibrillar orientation. Small-angle x-ray and neutron scattering (SAXS and SANS), on the other hand, can be used to probe the nanoscale structure of these materials, including the short-range order of cellulose microfibrils and pore structure under both dry and wet states. This presentation surveys the structural information obtainable by WAXS and SAXS/SANS from fibrillar cellulosic materials. In particular, examples related to the effects of pressurized hot water treatment on birch sawdust and of enzymatic hydrolysis on cellulosic substrates will be presented.



Small-angle x-ray scattering (SAXS)

Wide-angle x-ray scattering (WAXS)

