

Complex Molecular Architectures of Lignin Measured via Neutron Scattering

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Background

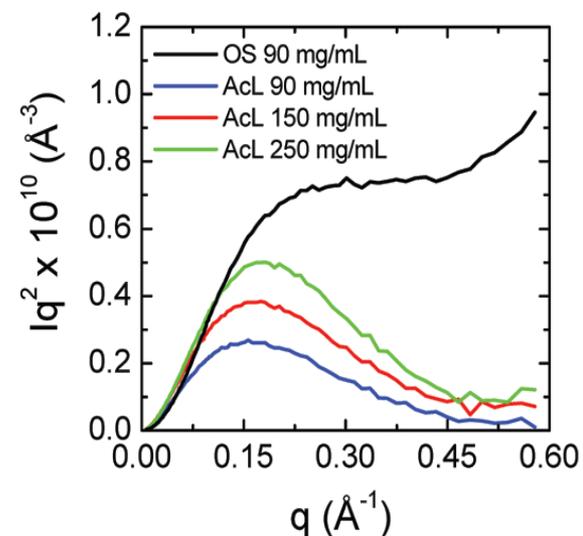
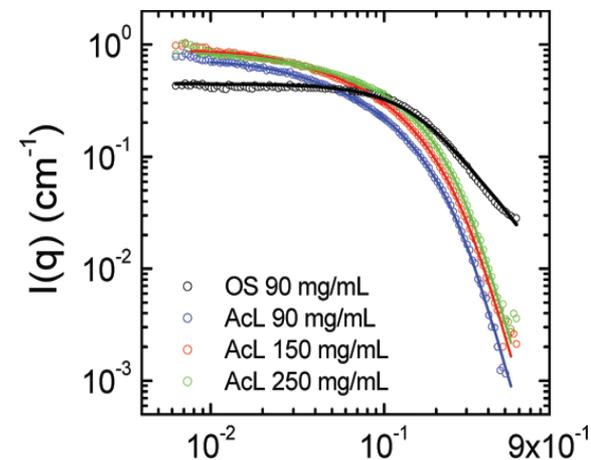
- Lignin is an abundant, naturally occurring biopolymer that is a promising renewable resource for engineering materials, such as carbon fibers. The molecular architecture of lignin is still elusive, and knowledge of this structure is important for materials technologies and for overcoming biomass recalcitrance in the production of biofuels.

Result

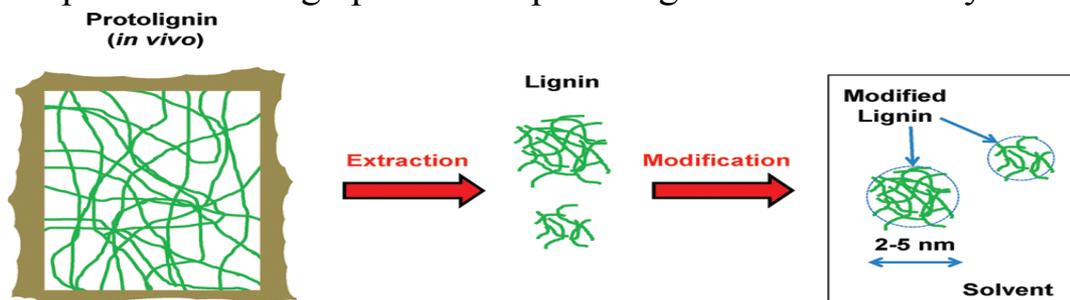
- The molecular structures of solvent-extracted lignins were probed. The neutron scattering results clearly show that lignin molecular architectures are somewhat rigid and complex, ranging from nanogels to hyperbranched macromolecules.

Impact

- Future characterization can be used to guide extraction processes as well as genetic engineering technologies to convert lignin into value added materials with the potential for high positive impact on global sustainability.



Bio-SANS absolute scattering (top) and Kratky plots (bottom) for oligostyrene (OS) and acetylated lignin (AcL) in deuterated THF.



Citation: Evidence for Complex Molecular Architectures for Solvent-Extracted Lignins, S E Harton, S V Pingali, G A Nunnery, D A Baker, S H Walker, D C Muddiman, T Koga, T G Rials, V S Urban, and P Langan, *ACS Macro Lett.* 2012, 1, 568-573