Guidelines for Performing Lignin-first Biorefining

Background

• Lignin-first biorefining considers lignin valorization on an equal footing to carbohydrate valorization in biomass conversion.
• Lignin-first methods are defined as “active stabilization methods that solubilize lignin from native biomass while avoiding condensation reactions in lignin.”
• Reductive catalytic fractionation (RCF) is a popular lignin-first biorefining method in the lignin valorization community because it is a catalytic funneling approach.

Approach

• This perspective attempts to unite the growing lignin-first community around a common set of guiding principles by defining standards and best practices for conducting research and reporting process performance in this field.

Significance

• After a century of lignin research, the goal of lignin valorization remains elusive, and yet is increasingly important.
• As the lignin-first biorefining field grows, this perspective should serve as a useful guide to allow easier inter-laboratory comparison and accelerate this field.

Three lignin-first strategies using solvolysis and catalytic stabilization of reactive intermediates to stable products or protection-group chemistry and subsequent depolymerization
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Significance
• As the lignin-first biorefining field grows, this perspective should serve as a useful guide for the community to follow common practices and report process performance data that can enable inter-laboratory comparisons