Resource Circulation

R&D Project Title : Elucidation of Structure-Property Relationships of Technical Lignin toward Development of Synthetic Technology for Advanced Materials

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Summary :

Technical lignin, an industrial byproduct of pulping, is an important resource for considering the practical use of lignin (an abundant and valuable aromatic biopolymer in trees). Despite its large and stable production worldwide, almost 100% has been incinerated as fuels. Converting technical lignin into a value-added material and using it in our daily lives over long-term would make a significant carbon-neutral contribution by retaining CO_2 that is originally fixed by trees.

Technical lignin is a quite different substance from natural lignin in trees because of undergoing chemical pulping processes. Therefore, its distinctive structure and properties need to be properly elucidated for its effective use as a raw material for advanced materials. This project first aims to systematically understand the relationship between the complex and diverse chemical structure and physical properties using our original techniques specialized for analyzing technical lignin. Based on the basic science and excellent characteristics of technical lignin, we will develop novel synthetic technologies for polymer-network materials with high-performance and unique functions that are not found in conventional petroleum-based materials.