High-performance Blends of Bio-based Elastomer from *Eucommia ulmoides* and Bioplastics

**Hiroshi Uyama**

Graduate School of Engineering, Osaka University, Japan

*Eucommia ulmoides* accumulates trans-1,4-polyisoprene (EuTPI) in the leaves, bark, root, and fruit coatings, which exhibits higher modulus and less flexibility than cis-1,4-polyisoprene. EuTPI can be regarded as a new class of high-performance bio-based elastomers. This study deals with blends of EuTPI and bioplastics such as poly(lactic acid) (PLA) and poly(butylene succinate) (PBS). The blend was made by kneading method. Addition of EuTPI significantly improved the toughness and impact resistance of PLA. EuTPI was modified by maleic anhydride and the modified EuTPI was used as compatibilizer between EuTPI and PLA or PBS. During the kneading, the anhydride group is subjected to the ring-opening, yielding carboxylic acid group, which enhances the interaction between EuTPI and bio-based polyesters. The toughness of PBS was significantly enhanced by the addition of the modified EuTPI. Hydroxy group-introduced EuTPI was also developed and added to PLA. This blend was partially insoluble in any solvents, suggesting the crosslinking between the modified EuTPI and PLA takes place. The mechanical properties of PLA was improved by the modified EuTPI. These results strongly suggest that EuTPI and the modified EuTPIs are good additives to produce high-performance bio-based polymer blends.

Corresponding author uyama@chem.eng.osaka-u.ac.jp

**Blend of EuTPI and PLA**

**Author Biography:** Dr. Hiroshi Uyama received his B.S. (1985) and M.S. (1987) from Kyoto University. In 1988, he joined the Department of Applied Chemistry, Tohoku University, as assistant professor and obtained Ph.D in 1991. He moved to the Department of Materials Chemistry, Kyoto University in 1997. In 2004, he was appointed as a full professor at the Department of Materials Chemistry, Osaka University.

Name: Hiroshi Uyama
University/Institute: Osaka University
Research Interest: Bioplastics, Biocomposites, Porous Materials