

## Comprehensive Valorization of Rubber Tree Seeds

Koji Nakano<sup>1</sup>

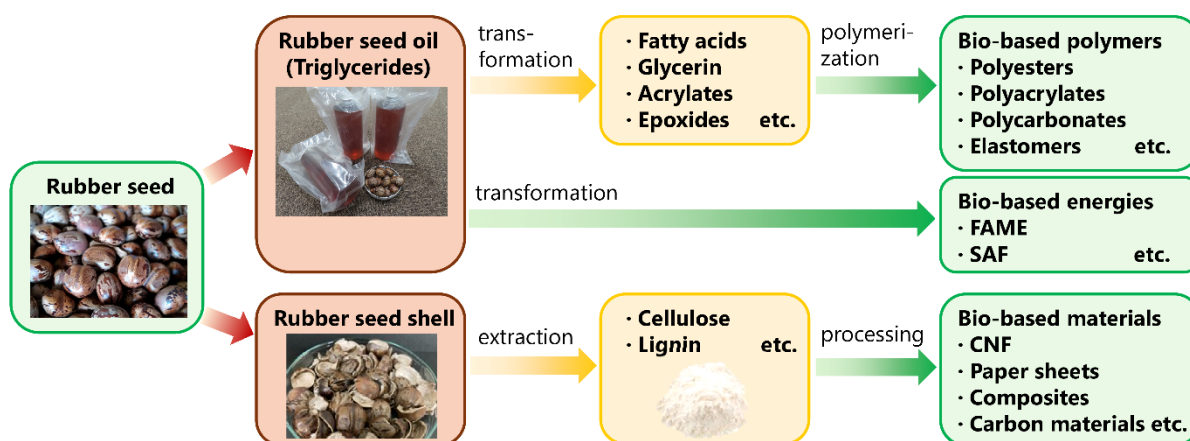
e-mail: k\_nakano@cc.tuat.ac.jp

<sup>1</sup> Department of Applied Chemistry, Graduate School of Engineering,  
Tokyo University of Agriculture and Technology

Rubber tree seeds are an abundant yet underutilized biomass resource generated in large quantities in rubber plantations. Although rubber plantations are primarily cultivated for latex production, rubber seeds are often discarded or used only for low-value applications. This project focuses on the integrated utilization of rubber seed oil (RSO) and rubber seed shell (RSS) for the development of sustainable materials and biodiesel fuels.

RSO contains a high proportion of unsaturated fatty acids, making it a promising renewable feedstock for the synthesis of bio-based functional polymers and alternative fuels. In parallel, the lignocellulosic seed shells possess significant potential as biomass resources for the preparation of cellulosic materials, carbonaceous materials, adsorbents, and functional fillers for composite materials. By combining biomass conversion technologies with polymer synthesis and energy-related applications, this project aims to establish an environmentally friendly and resource-efficient platform for the valorization of all major components of rubber seeds.

This project also emphasizes sustainability and circular resource utilization by promoting waste reduction and local biomass utilization in rubber plantations. Through an interdisciplinary approach integrating biomass chemistry, polymer science, and renewable energy technologies, this project seeks to contribute to the development of sustainable materials and next-generation green manufacturing systems. Ultimately, this project is expected to advance circular bioeconomy strategies and enhance the value of renewable agricultural resources through innovative material and fuel applications.



## Biography (For Plenary, Keynote, and Invited Speakers)

**Name:** Koji Nakano

**Title:** Professor, Dr.

**Affiliation:** Tokyo University of Agriculture and Technology

**Country:** Japan

**Phone:** +81-42-388-7162

**E-mail:** k\_nakano@cc.tuat.ac.jp



### Personal History:

Dr. Koji Nakano received his Ph.D from Kyoto University under the guidance of Professor Tamejiro Hiyama in 2005. He started his academic career as an assistant professor at the University of Tokyo (Professor Nozaki's group) in 2002. In 2012, he moved to Tokyo University of A&T as senior assistant professor, and was promoted to associate professor in 2015 and to full professor in 2024. His research interest is the development of polymerization catalysts and new functional materials based on polymers and  $\pi$ -conjugated compounds.

### Research Keyword (3-5 keywords use commas to separate each word):

Organic/Polymer synthesis, Catalysts, Bio-based polymers,  $\pi$ -Conjugated compounds