

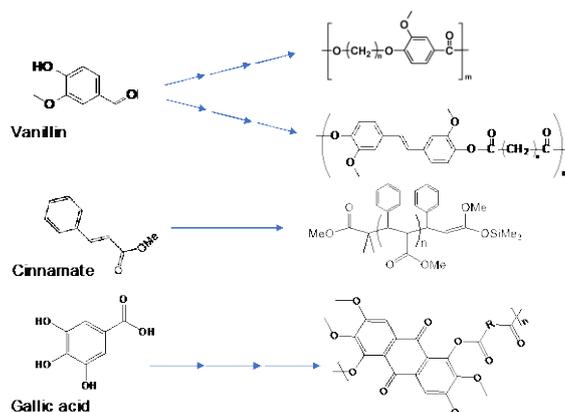
## Novel Polymeric Materials Utilizing Bio-based Aromatics

**Hideki Abe<sup>a</sup>**

<sup>a)</sup>*Bioplastic Research Team, RIKEN Center for Sustainable Resource Science, Japan*

We have promoted the basic research program to provide novel high-performance bio-based polymer materials from bio-based aromatic chemicals. The synthesis of aromatic polyesters from vanillin derivatives gave the high molecular weight products ( $M_w > 50,000$ ) with higher melting temperature over 190 °C and with excellent mechanical properties as 120 MPa of tensile strength and 4.3 GPa of Young's modulus. When the diol monomer derived from the dimerization of vanillin was polymerized with succinate, the obtained polyester became a high-heat resistant material with a melting temperature of 284 °C and a glass transition temperature of 114 °C. We also embarked on the synthesis of novel bio-based aromatic acrylic resins from cinnamate derivatives. The organic acids such as super strong acids catalyzed the group transfer polymerization of cinnamate derivatives at a C-C double bond to give the corresponding polymer molecules. Under the optimized conditions, the reaction yielded polymers of cinnamate derivatives with relative high molecular weights ( $M_w > 30,000$ ). The obtained polymers had higher glass transition temperature of 165 °C, and the values were comparable to that of common petrochemical engineering plastic of polycarbonate.

Corresponding author e-mail: [habe@riken.jp](mailto:habe@riken.jp)



Chemical structure of bio-based aromatic monomers and obtained polymeric products

**Author Biography:** Hideki Abe was educated at the Tokyo Institute of Technology (1987-1993). Since 1993 he has been working at RIKEN. He received his Ph.D. degree in 1996 from Tokyo Institute of Technology. He successively held various positions in RIKEN, and was promoted to Team Leader of Bioplastic Research Team, RIKEN, in 2010. He is also a Visiting Professor at Tokyo Institute of Technology since 2002 and at Gunma University since 2016. His current research interests include the developments of biodegradable polymer materials for a variety of applications and the creations of novel bio-based polymer materials.

Name: Hideki Abe  
 University/Institute: RIKEN Center for Sustainable Resource Science  
 Research Interest: Polymer synthesis, Bio-based materials

