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# PRECISION ENZYMATIC SYNTHESIS OF POLYSACCHARIDE-BASED FUNCTIONAL MATERIALS

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**In this presentation, precision synthesis of polysaccharide-based functional polymeric materials by enzymatic approach is reported. The enzymatic approach has been identified as a useful tool to precisely synthesize functional polysaccharides, which have been interestingly much attention as new biomedical and tissue engineering materials. Phosphorylase is one of the enzymes that are practically used as the catalyst for synthesis of polysaccharides with well-defined structure. Phosphorylase-catalyzed enzymatic polymerization is progressed by using -D-glucose 1-phosphate and maltooligosaccharide as monomer and primer, respectively, to produce amylose. As the polymerization is initiated from the primer, it can be conducted using primers covalently immobilized to other polymeric materials (immobilized primers), giving rise to amylose-grafted polymeric materials. By means of the property of the spontaneously formation of double helix from amyloses, the phosphorylase-catalyzed enzymatic polymerization using the immobilized primers produces network structures composed of the double helix cross-linking points. In most cases, furthermore, the enzymatic polymerization solutions turns into hydrogels. For example, the phosphorylase-catalyzed enzymatic polymerization using maltooligosaccharide-grafted chitin nanofibers produced amylose-grafted chitin nanofiber hydrogels. Moreover, microstructures, which were hierarchically constructed by lyophilization of the hydrogels, were changed from network to porous morphologies depending on the molecular weights of amylose graft chains**

## Biography

Jun Ichi Kadokawa received his PhD Degree in 1992. He then joined Yamagata University as a research associate. From 1996 to 1997, he worked as a visiting scientist at the Max-Planck-Institute for Polymer Research in Germany. In 1999, he became an associate professor at Yamagata University and moved to Tohoku University in 2002. He was appointed as a professor of Kagoshima University in 2004. His research interests focuses on polysaccharide materials. He received the award for Encouragement of Research in Polymer Science (1997) and the Cellulose Society of Japan Award (2009). He has published more than 200 papers in academic journals.

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