KUDO LAB.

[Precise design of molecules – catalysts and functional materials]

Department of Materials and Environmental Science

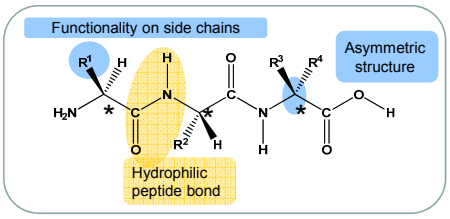
http://www.iis.u-tokyo.ac.jp/~kkudo/

Molecular Functional Materials Synthesis

Department of Chemistry and Biotechnology

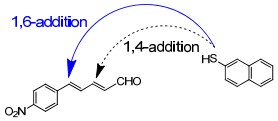
To make valuables through dialog with molecules

Peptide catalyst (PepCat)



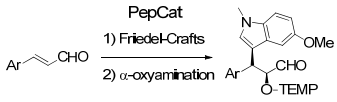
⇒Environmentally Benign Synthetic Catalyst

Regioselective reaction



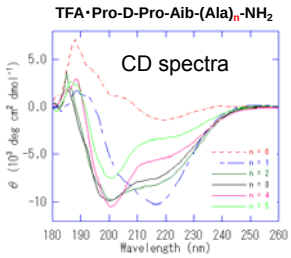
	1,6-	1,4-
PepCat	96 :	4
common catalyst	40 :	60

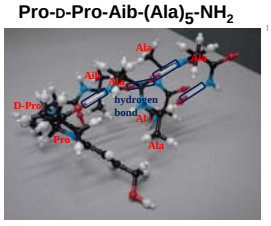
One-pot sequential reaction



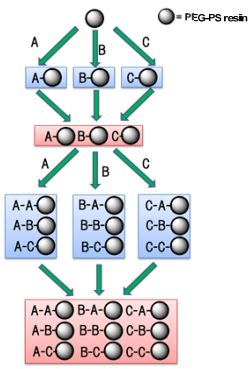
Straightforward synthesis of structurally complicated molecules.

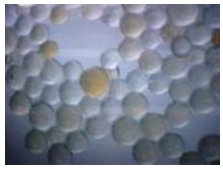
Mechanistic consideration for stereoselectivity

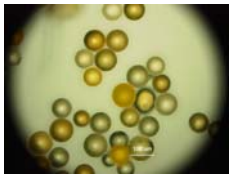




Survey of optimum catalyst from library

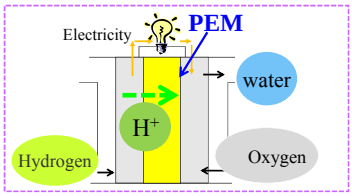




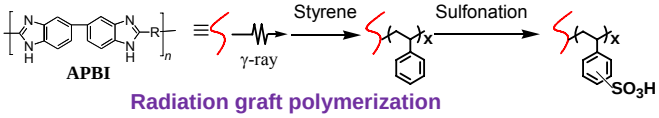


Polymer materials

Polyelectrolyte membrane (PEM) for fuel cell



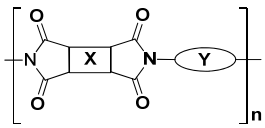
Fuel Cell
Generate electricity by using hydrogen and oxygen
High stability and proton conductivity are required

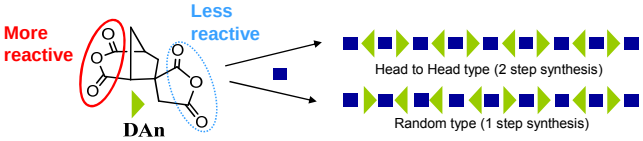


Radiation graft polymerization

High performance PEM was successfully developed by using radiation graft polymerization technique.

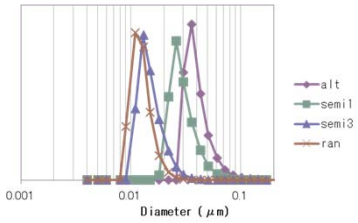
Physical properties of polyimides made by precise polymerization





Structurally isomeric polyimides were synthesized with using same set of monomers → Significant difference in physical properties were observed.（dielectric constant, glass transition temperature, density）

Four structurally isomeric amphiphilic copolyimides were prepared from a set of monomers with identical composition. They showed different size of aggregated particle in the water



Formation of silver microwire on photopatterned polymer film