

KUDO LAB.

[Precise design of molecules – catalysts and functional materials]

Department of Materials and Environmental Science

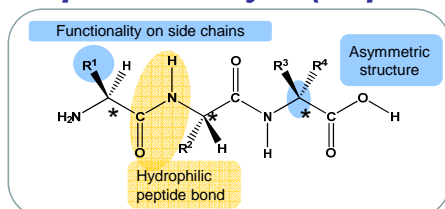
<http://www.iis.u-tokyo.ac.jp/~kkudo/>

Molecular Functional Materials Synthesis

Department of Chemistry and Biotechnology

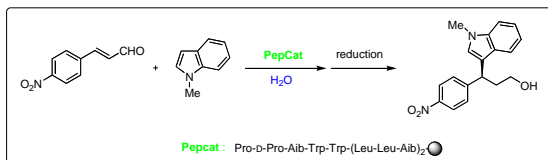
To make something valuable through dialog with invisible molecules

Peptide catalyst (PepCat)



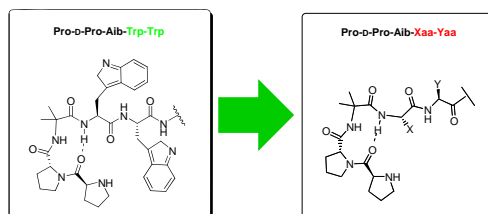
⇒ Environmentally Benign Synthetic Catalyst

Asymmetric reaction in water



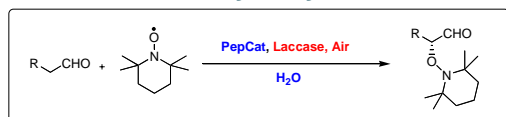
Secondary structure of peptide catalyst optimized

PepCat with novel sequence



Potentially applicable for kinds of reactions

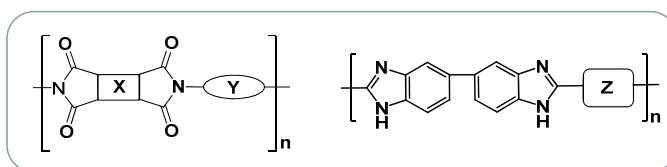
Combined catalyst system



Laccase (redox enzyme)
 • Uses oxygen in the air as an oxidant
 • Works under aqueous conditions

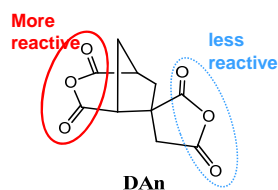
Use of redox enzyme can omit heavy metal cocatalysts

Polymer materials



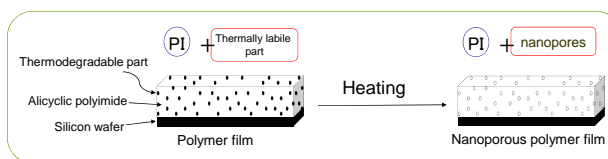
⇒ Thermosetting, mechanically strong polymers having various applications

Clarification of unique reactivity



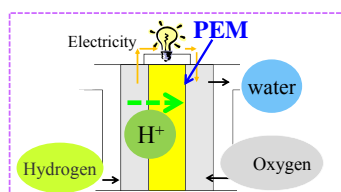
Mechanistic insight of regioselectivity of DAn, which has been applied for the synthesis of structurally ordered polyimides, was clarified

Interlayer dielectrics for LSI

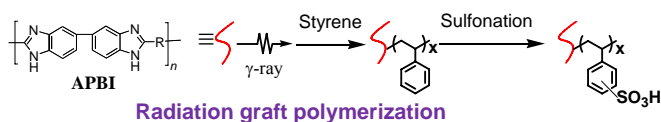


Alicyclic polyimide having thermodegradable part was applied for nanoporous low-k material

Polyelectrolyte membrane (PEM) for fuel cell



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



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