

YOSHIE LAB.

Dynamic Polymer Materials

Department of Materials and Environmental Science



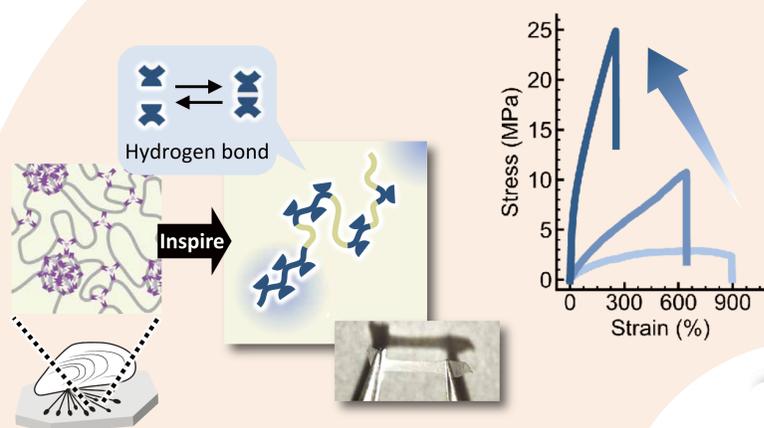
Environment - Conscious Polymeric Materials Science

Department of Chemistry and Biotechnology, Graduate School of Engineering

<http://yoshielab.iis.u-tokyo.ac.jp/>

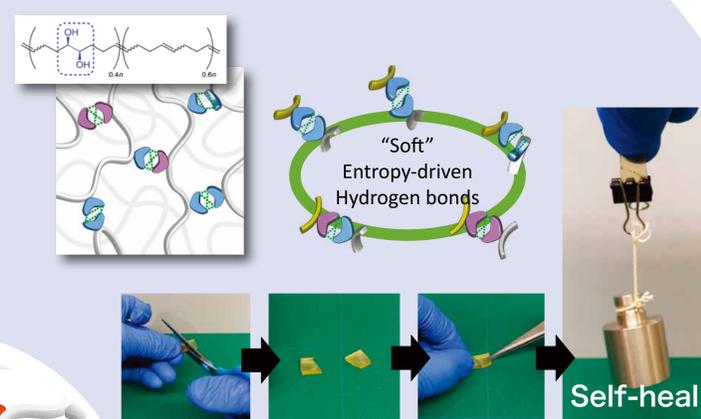
We create new high-performance materials such as tough self-healable elastomers and environment-responsive degradable polymers, through the dynamic control of hierarchical structure of polymeric materials spanning from molecular to mesoscopic scales.

Bio-inspired tough polymer



Mussels have a string-like tough organ called byssus to fix themselves to rocks. Inspired by the multiphase structure formed by dynamic crosslinks in byssus, we developed a new material with high mechanical toughness.

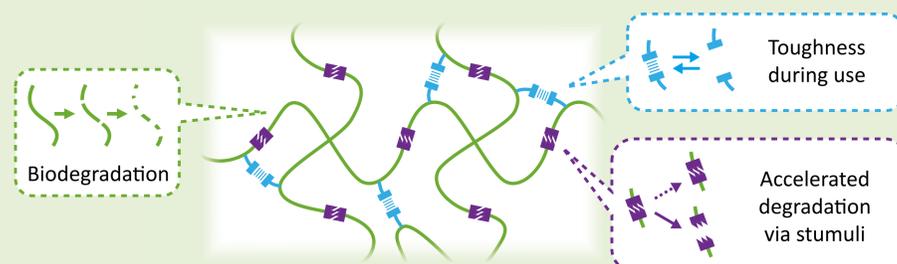
Tough rubber that heals by itself



What if materials like rubber can heal their wounds by itself? It will greatly prolong the materials' lifetime. We discovered that hydrogen bonds between very simple chemical motifs (vicinal diols) make a rubber mechanically tough and self-healable.

Functions through Dynamicity

Polymer with toughness and environment degradability



To tackle the global issue of plastic wastes, polymers that can degrade in environment are highly anticipated. We are developing polymer materials that keeps good toughness during use and can degrade rapidly by external stimuli in nature.