Yoshie LAB.

[Materials developed by polymer dynamics]

International Research Center for Sustainable Materials

http://yoshielab.iis.u-tokyo.ac.jp/top.htm

Polymeric and Environmentally Conscious Materials

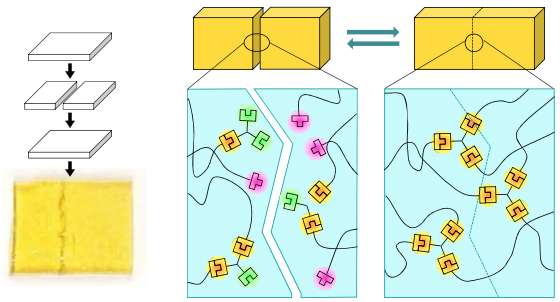
Department of Chemistry and Biotechnology

Polymers constructed by dynamic bonds

Polymer with novel environmental functions are developed by using dynamic bonds such as reversible covalent bonds and hydrogen bonds. By coordinating phase transition behavior (crystallization/melt) with reversibility of the dynamic bond, we dynamically change the multi-level structure, which induces various novel functionality of polymers.

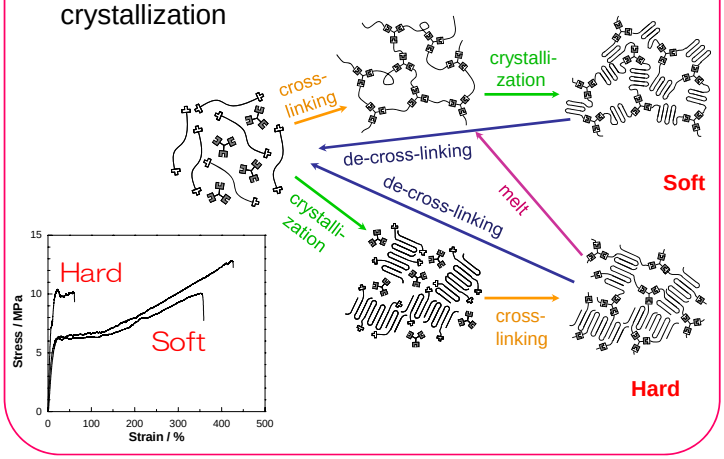
Remendability

Achieve a good balance between remendability and material performance by designing reversibility and molecular mobility.



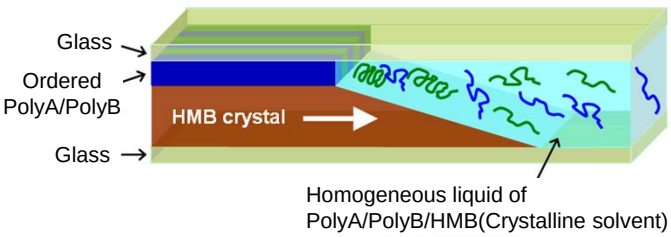
Soft ⇔ hard Conversion

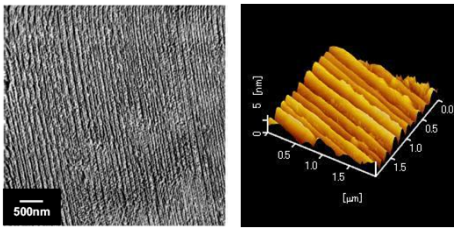
Control of the sequencing of cross-linking and crystallization



Nano-ordered patterns by polymer blends

We successfully obtained a long-range ordered nanoscopic lamellar morphology in polymer blends by using directional crystallization onto crystalline solvent. This method using polymer blends instead of block copolymers may serve as a low-cost facile way to produce nanoscale lamellar orientation in thin films.





Crystallizing the solvent dissolving polyA and polyB induces (1) solidification of the polymers, (2) axial crystallziation of polyA and (3) freezing of the non-equilibrium structure, sequentially but instantly, to give the nano-ordered structure.