

Novel Material Recycle Process Based on The Physical Degradation and Physical Regeneration Theory

Shigeru Yao^{a)}, Natsumi Yamasaki^{a)}, Patchiya Phanthong^{a)}, Keitaro Yamashita^{a)}, Yasuko Ueno^{a)}, Tetsuyosi Michiue^{b)}, Eiichi Takatori^{c)}

^{a)} Department of Chemical Engineering, Graduate school of Fukuoka University

^{b)} Eco-Feel Co. Ltd.

^{c)} TOSOH Analysis and Research Center Co.,Ltd.

In these days, the amount of plastic waste is being extremely large, and become very serious problem. The best way to reduce them is recycle. In Japan, currently, most waste plastics are collected and recycled by one of three methods: thermal, chemical, and material recycling. An ideal approach would be to material recycle, however, the ratio of material recycle is still remained about 30%. This is because the mechanical properties of products made from material-recycled plastics are inferior to those of products made from virgin plastics. Therefore, material-recycled plastics are only used in low-value-added products and have limited applications.

The poor mechanical properties of material-recycled plastics are believed to be due to the chemical degradation. Such chemical degradation is thought to be irreversible because it is associated with the breaking of molecular chains.

However, our recent research indicated that the molecular properties of material-recycled plastics are not chemically degraded. We also found that the poor mechanical properties of the recycled plastics come from the change of the inner structure of plastics (that is "Physical Degradation") and the mechanical properties can physically regenerate. Based on the theory, we constructed novel material recycle process of recycled plastics

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Corresponding author shyao@fukuoka-u.ac.jp

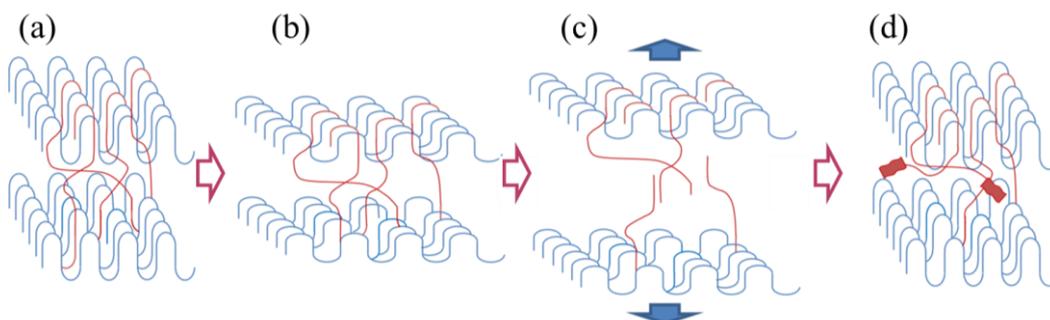


Figure Schematic image of physical degradation mechanism

Author Biography: Shigeru Yao has completed his Ph.D from Kyoto University.

And he had worked at Ube Industries, Mitsuishi Research Institute.

At 2011, he had become a professor of Fukuoka University.

He is now also be a Director of Academic, Industrial, and Governmental Liaison Center and

AIG Collaborative Research Institute for Creation of Functional and Structural Materials.

His research themes are polyolefin surface modification function of side chain crystalline polymer and physical degradation and regeneration of polymers.

