

Promoting recycling and reuse in society through research into chemical waste recycling

Applied Chemistry Recycling Chemistry (Yoshioka Laboratory)



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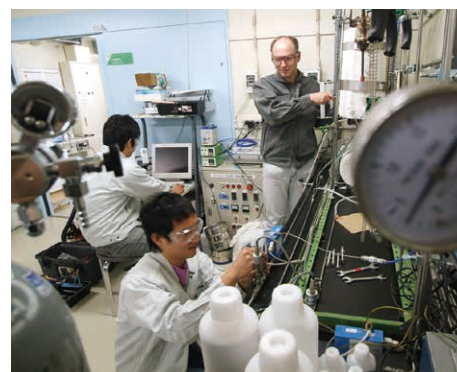
Graduated from Sendai Daiichi Senior High School and studied at the Tohoku University Graduate School of Engineering. Was a member of the mountaineering club at high school; joined the overseas mountaineering club at university and also formed a soccer team with friends, reaching league level. "I made some unforgettable friendships during my time at university."

Recycling is a key concept in global environmental conservation. In order to encourage recycling and reuse of resources and materials throughout society, we are conducting research into chemical recycling methods for organic materials (mainly waste plastics) and inorganic materials, and developing processes for synthesizing water purification materials.

Many of the plastics that we use and throw away every day represent valuable resources that can be recycled in order to reuse the energy inherent in these materials. Our aim is to find the mode of recycling that is ultimately the most beneficial to the environment while providing the optimum benefit to society.

Whereas all metals can be reduced to their base form regardless of processing method, plastic represents an aggregate of carbon, oxygen and hydrogen among other elements. During the manufacturing process, the material may be changed irreversibly through heat treatment or through the addition of other material or functionality. This makes separation and recovery much more difficult. Our research looks at chemical systems and other added-value techniques for converting waste plastics into useful fuels and materials, as well as functionality enhancement through "upgrade recycling" to create usable products that are immediately marketable.

Research necessarily involves a great deal of trial and error and much endless repetition. But this is all forgotten in that moment of elation when you successfully demonstrate a new hypothesis, or in the flash of inspiration that accompanies a new discovery. Furthermore, we believe that our research has tremendous significance for the future of our planet.



Main research themes

- Recovery of chemical materials from waste plastics
- Use of layered double hydroxides in wastewater and wastegas processing
- Wet and dry treatment process of high impact polystyrene containing brominated flame retardants
- Wet dechlorination treatment of waste plastics containing chlorine
- Recovery of metal from wastes using a chloride volatilization process