Green & Sustainable Chemistry Awards

The First Green and Sustainable Chemistry Awards
were given to the following three achievements in April, 2002
by Green & Sustainable Chemistry Network, Japan.

Water-bone Recycling Paint System

Sakuichi KONISHI, Kazuo UENOYAMA, Susumu HIBI,
Jun-ichi SUEYOSHI and Sumio NISHIOKA

Nippon Paint Co., Ltd.

Paint & coating plays an important role in forming the film on the surface of substances, in improving the durability by protecting the substances, in designing our comfortable life by decorating.
In the case of the current spraying coating system, the environmental demerit such as emission of organic solvent, disposing the over-sprayed paint as industrial waste, and so on, was expected very much to improve.
“Recycle Water-Borne system” is composed of collecting the over-sprayed paint into booth water, separating the paint from water, concentrating it and reusing/ recycling it, and is also a system aiming the zero-emission.

The aqueous-coated photothermographic film

Hirohiko TSUZUKI, Kenji NAKAJIMA, Akira HATAKLEYAMA,
Toshikhiko MAEKAWA and Ichizo TOYA

Fuji Photo Film Co., LTD.

As digitization is prevailing in the medical field, doctors strongly desire high quality photographic films for their diagnosis, which are applied for digital image. Mention environment, the photothermographic system has an advantage of no waste solution, and a disadvantage of using enormous amount of organic solvent in the production. We succeeded in the drastic reduction of organic solvent with the aqueous-coated photothermographic film using the aqueous latex.

Development of environmentally friendly heterogeneous catalysts using unique properties of inorganic crystallines

Kiyotomi KANEDA

Department of Chemical Science and Engineering,
Graduate School of Engineering Science, Osaka University

High performance heterogeneous catalysts aiming at environmentally benign chemical processes were developed by utilizing the unique properties of inorganic crystallines, i.e. hydroxyapatite, montmorillonite, and hydrotalcite. Representative successes in this research are as follows. 1) A highly efficient catalytic oxidation of alcohols was accomplished using molecular oxygen as a "green" oxidant with Ruthenium and Palladium phosphate complexes on the surface of the hydroxyapatite, the main component of bone. 2) The novel chain-like species of Titanium and Scandium created within the expansible interlayer of the montmorillonite displayed strong acidities capable of catalyzing aromatic alkylation and Michael addition under solventless conditions. 3) Unusual base sites generated on the hydrotalcite surface could catalyze highly selective aldol reaction of aldehydes in water. 4) A unique acid-base bifunctional surface of the Magnesium-Aluminum mixed oxide derived from the hydrotalcite could attain cycloaddition of CO_2 to various epoxides to yield five-membered cyclic carbonates under atmospheric CO_2 pressure.
The above methods using the sophisticated heterogeneous catalysts can replace synthetic processes of low atom efficiency that use hazardous stoichiometric reagents, and thus minimize wastes in manufacturing pivotal chemicals.