

Environmental Development Engineering major (Environmental Engineering Lab, Professor Hiroaki Ozaki)

1. Research topics

Overview

For over a decade, our laboratory has installed cutting-edge devices for analyzing environmental trace contaminants to understand the behavior of not only conventional organochlorides but also new persistent organic pollutants (such as pharmaceuticals and organofluorine and organobromine compounds, etc.) in water environments. We have also developed new separation (condensation) and decomposition technologies. Existing processing technologies generally do not break down these contaminants and there are concerns regarding the great risks to human and animal health and natural ecosystems. Cesium pollution in connection with the Great East Japan Earthquake of 2011 has also been a major problem and we have been conducting dual-faceted basic and actual processing research related to eliminating cesium from sewage sludge and incinerator ash from it.

Our research topics are listed below.

I. Topics related to new persistent pollutants—pharmaceuticals (including anti-influenza drugs), organofluorine, organobromine compounds, etc.

(1) Understanding behavior in water environments and substrata

(2) Understanding behavior in sewage treatment plants and other wastewater treatment facilities

(3) Development of new separation (condensation) and decomposition technologies: Membrane separation processes; advanced oxidation processes, including UV degradation techniques; electrolysis; indirect thermal desorption, etc.

(4) Development of new technologies for treating contaminated soil, sludge and bottom sediment (including elucidation of byproduct behavior) and actual treatment

II. Topics related to solid-phase cesium in sewage sludge and its incinerated ash

(1) Understanding the contaminating behavior of solid-phase cesium and other radioactive substances in soil, sludge, and bottom sediments

(2) Developing methods for scrubbing, extracting and condensing radioactive

substances

(3) Developing technologies for enriching cesium with ferrocyanides and applying them in actual processing

(4) Developing technologies for containing radioactive concentrates

(5) Evaluating the reduction of risk in actual processing

2. Publication lists

1) X. Chen, H. Ozaki, R.R. Giri, S. Taniguchi, R. Takanami; Low-pressure reverse osmosis membrane separation of non-fluorinated and perfluorinated organic compounds in water, *Desalination and Water Treatment*, Vol.52, (issue 31-33), pp.5796-5805, 2014.

2) Y. Fujikawa, P. Wei, A. Fujinaga, H. Tsuno, H. Ozaki: Removal of Cesium from the Extract of Municipal Water Treatment Sludges and Wastes by Precipitation with Ferrocyanide Solids, *Proceedings of the 15th International Conference on Environmental Remediation & Radioactive Waste Management*, ICEM2013-96321, 2013.

3) R. R. Giri, H. Ozaki, T. Okada, S. Taniguchi, R. Takanami: Factors influencing UV photodecomposition of perfluorooctanoic acid in water, *Chemical Engineering Journal*, Vol.180, pp.197-203, 2012.

4) R. Takanami, S. Taniguchi, S. Hayashi, R. R. Giri, H. Ozaki: Behavior and risk assessment of anti-influenza virus drugs in upstream section of Neyya River: *JSCE J. of Environmental Systems and Engineering*, Vol.68, No.7, pp.185-182, 2012.

5) H. Ozaki, N. Ikejima, Y. Shimizu, K. Fukami, S. Taniguchi, R. Takanami, R.R. Giri and S. Matsui: Rejection of pharmaceuticals and personal care products (PPCPs) and endocrine disrupting chemicals (EDCs) by low pressure reverse osmosis membranes, *Water Science & Technology*, Vol.58, No.1, pp.73-81, 2008

6) H. Ozaki, S. Taniguchi, R. Takanami, N. Shimomukai, M. Sugahara, R.R. Giri: Quantification of dioxin in the sieved fraction of river sediment, *Water Science & Technology*, Vol.52, No.9, pp.225-233, 2005

3. Selected Recent Research Projects

1) Development of novel treatment technologies of designated wastes containing radioactive substances such as cesium; Grant-In-Aid for Scientific Research (A) supported by Japan Society for the Promotion of Science (JSPS), 2014-2017 (ongoing)

2) R & D site of new technologies for removing radioactive substances and organic

hazardous substances from solid phase; “Strategic Research Foundation Grant-aided Project for Private Universities”: matching fund subsidy from MEXT (Ministry of Education, Culture, Sports, Science and Technology-JAPAN), 2012-2016 (ongoing)

3) The novel cutting-edge technologies to eliminate refractory perfluorinated compounds in water environment; Research Project, Grant-In-Aid for Scientific Research (B) supported by Japan Society for the Promotion of Science (JSPS), 2011-2013