



## Hideo TAJIMA, Ph.D.

Associate Professor

Program: Advanced Materials Science and Technology

Area: Applied Chemistry and Chemical Engineering

Undergraduate: Dept. of Engineering

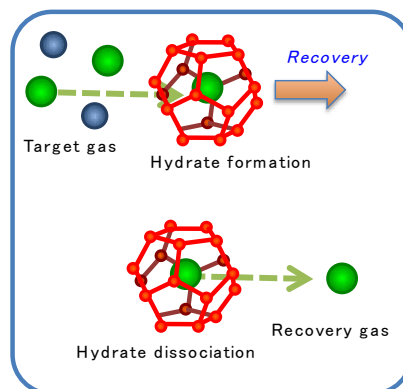
### Professional Expertise

His professional expertise is to develop a novel separation engineering technology and separating agent production for the protection of atmospheric and aquatic environments, with applying phase transition based on the fields of chemical engineering. He focuses on a recovery of greenhouse gases and valuable materials by control of solid-liquid and vapor-solid phase transition, phase transfer, and heterogeneous reaction.

### Research Fields of Interest

His main topic is design of greenhouse gas recovery and separation with gas hydrate formation and dissociation. Gas hydrate is an ice-like solid consisted of gas (mixture) and water molecules. The hydrate framework can trap greenhouse gas from gaseous mixture at certain pressure and temperature conditions. He has studied about gas recovery for various gases; refrigerant gases (R-22, R-134a), sulfur hexafluoride, carbon dioxide, and so on. He tries to control the target gas concentration in recovery gas by forming and then decomposing hydrate solid.

Also he has recently other two topics for his research: Improvement design of separation and purification of biodiesel fuel consisted of unsaturated and saturated fatty acid methyl ester, and recovery of metal ions by special designed adsorption or extraction systems. Every topic relates with vapor-solid or solid-liquid phase transition, phase transfer, and heterogeneous reaction.



### Education

2000: Ph.D. Eng., Graduate School of Engineering, Soka University, Japan

1997: M.Eng., Graduate School of Engineering, Soka University, Japan

1995: B.Eng., Department of Bioengineering, Soka University, Japan

### Professional Societies and Activities

1. Member of the Society of Chemical Engineers, Japan
2. Member of the Chemical Society of Japan
3. Member of the Japan Institute of Energy
4. Member of the Material Technology of Japan Research Institute

### Awards

1. Masui R., Tajima H., and Yamagiwa K., Paper Award in the Japan Research Institute of Material Technology, 2011

## Major Publications

### Papers

- [1] H. Tajima, Y. Oota, K. Yamagiwa, "Improving the Gas Recovery and Separation Efficiency of a Hydrate-based Gas Separation", *Chem. Eng. Res. Des.*, inpress, 2014
- [2] H. Tajima, F. Sato, K. Yamagiwa, "Effect of Hydrophobic Pollution on Response of Thermo-Sensitive Hydrogel", *Chemosensors*, vol.1, pp.21-32, 2013
- [3] H. Tajima, S. Morimoto, Y. Yoshida, K. Yamagiwa, "Study on Temperature Response in Raspberry-Form Gels of Poly (N,N-Diethylacrylamide)", *Polym. Sci. Ser. A*, vol.54, no.10, pp.787-797, 2012
- [4] H. Tajima, Y. Yoshida, K. Yamagiwa, "Experimental Study of Swelling and Shrinking Kinetics of Spherical Poly(N,N-Diethylacrylamide) Gel with Continuous Phase Transition", *Polymer*, vol.52, no.3, pp.732-738, 2011
- [5] H. Tajima, Y. Yoshida, S. Abiko, K. Yamagiwa, "Size adjustment of spherical temperature-sensitive hydrogel beads by liquid-liquid dispersion using a Kenics static mixer," *Chem. Eng. J.*, vol.156, no.2, pp.479-486, 2010.
- [6] H. Tajima, T. Nagata, Y. Abe, A. Yamasaki, F. Kiyono, K. Yamagiwa, "HFC-134a hydrate formation kinetics during continuous gas hydrate formation with a Kenics static mixer for gas separation," *Ind. Eng. Chem. Res.*, vol.49, no.5, pp.2525-2532, 2010.
- [7] H. Tajima, F. Kiyono, A. Yamasaki, "Direct Observation of the Effect of Sodium Dodecyl Sulfate (SDS) on the Gas Hydrate Formation Process in a Static Mixer," *Energy Fuels*, vol.24, no.1, pp.432-438, 2010.
- [8] H. Tajima, R. Nagaosa, A. Yamasaki, F. Kiyono, "An analysis of the formation process of the liquid CO<sub>2</sub> drops with and without hydrate formation in a static mixer," *AIChE J.*, vol.56, no.10, pp.2706-2716, 2010.
- [9] S. J. Yoon, J. G. Lee, H. Tajima, A. Yamasaki, F. Kiyono, T. Nakazato, H. Tao, "Extraction of lanthanide ions from aqueous solution by bis (2-ethylhexyl) phosphoric acid with room-temperature ionic liquids," *J. Ind. Eng. Chem.*, vol.16, no.3, pp.350-354, 2010.
- [10] H. Tajima, S. Yokoyama, M. Yoshida, K. Yamagiwa, "Removal and recovery of phenol by temperature-swing adsorption with temperature-sensitive DEAA-ENT gel," *Material Technology*, vol.28, no.2, pp.64-68, 2010.
- [11] T. Nagata, H. Tajima, A. Yamasaki, F. Kiyono, Y. Abe, "An analysis of gas separation processes of HFC-134a from gaseous mixtures with nitrogen-comparison of two types of gas separation methods, liquefaction and hydrate-base methods, in terms of the equilibrium recovery ratio," *Sep. Purif. Technol.*, vol.64, no.3, pp.351-356, 2009.
- [12] H. Tajima, T. Nagaata, A. Yamasaki, F. Kiyono, T. Masuyama, "Formation of HFC-134a Hydrate by Static Mixing," *J. Petro. Sci. Eng.*, vol.56, no.1-3, pp.75-81, 2007.
- [13] H. Tajima, Y. Nakajima, J. Otomo, H. Nagatomo, A. Yamasaki, F. Kiyono, "Direct Observation of the Effect of Sodium Dodecyl Sulfate (SDS) on the HCFC-22 Hydrate Formation in a Static Mixer," *Chem. Lett.*, vol.36, no.10, pp.1212-1213, 2007.
- [14] H. Tajima, A. Yamasaki, F. Kiyono, H. Teng, "Size

Distribution of CO<sub>2</sub> Drops in Water in A Static Mixer for Ocean Disposal," *AIChE J.*, vol.52, no.8, pp.2991-2996, 2006.

- [15] H. Tajima, A. Yamasaki, F. Kiyono, "Process Design of a New Injection Process of Liquid CO<sub>2</sub> in the Ocean by Using a Static Mixer – Prediction of the Fate of the Released Liquid CO<sub>2</sub> Drop in the Ocean and Energy Dissipation of the Process," *Fuel Proc. Technol.*, vol.86, no.14-15, pp.1667-1678, 2005.
- [16] H. Tajima, A. Yamasaki, F. Kiyono, "Effects of Mixing Functions of Static Mixer on the Formation of CO<sub>2</sub> Hydrate from the Two-phase Flows of Liquid CO<sub>2</sub> and Water," *Energy Fuels*, vol.19, no.6, pp.2364-2370, 2005.
- [17] H. Tajima, A. Yamasaki, F. Kiyono, H. Teng, "A New Method for Ocean Disposal of CO<sub>2</sub> via A Submerged Kenics-Type Static Mixer," *AIChE J.*, vol.50, no.4, pp.871-878, 2004.
- [18] H. Tajima, A. Yamasaki, F. Kiyono, "Energy Consumption Estimation for the Greenhouse Gases Separation Processes by Clathrate Hydrate Formation," *Energy*, vol.29, no.11, pp.1713-1729, 2004.
- [19] H. Tajima, A. Yamasaki, F. Kiyono, "Continuous Formation of CO<sub>2</sub> Hydrate via a Kenics-type Static Mixer," *Energy Fuels*, vol.18, no.5, pp.1451-1456, 2004.
- [20] Tajima, A. Yamasaki, F. Kiyono, "Continuous CO<sub>2</sub> Clathrate Hydrate Formation by Motionless Mixer," *Stud. Surf. Sci. Catal.*, vol.153, pp.501-506, 2004.
- [21] Y. Seo, H. Tajima, A. Yamasaki, S. Takeya, T. Ebinuma, F. Kiyono, "A New Method for Separating HFC-134a from Gas Mixtures Using Clathrate Hydrate Formation," *Environ. Sci. Technol.*, vol.38, no.17, pp.4635-4639, 2004.
- [22] H. Tajima, H. Inoue, M. M. Ito, "Computational study of mechanism of formose reaction catalyzed by thiazolium salt," *J. Comput. Chem. Japan*, vol.2, no.4, pp.127-134, 2003.
- [23] H. Tajima, T. Niitsu, H. Inoue, "The formose reaction on a synthetic zeolite impregnated with thiazolium catalyst," *J. Chem. Eng. Japan*, vol.35, no.6, pp.564-568, 2002.
- [24] H. Tajima, T. Niitsu, H. Inoue, "Effects of thiazolium counter anion and reaction media on the activity of immobilized thiazolium catalyst," *J. Chem. Eng. Japan*, vol.34, no.4, pp.553-557, 2001.
- [25] H. Tajima, T. Niitsu, H. Inoue, "Effect of unsteady diffusion on reaction rate of immobilized catalyst reaction in batch system," *J. Chem. Eng. Japan*, vol.33, no.6, pp.894-897, 2000.
- [26] H. Tajima, T. Niitsu, H. Inoue, "Repeated use of thiazolium catalyst immobilized on cation-exchange resin," *J. Chem. Eng. Japan*, vol.33, no.5, pp.793-796, 2000.
- [27] H. Tajima, T. Niitsu, H. Inoue, "Polymerization of formaldehyde by an immobilized thiamine catalyst on cation-exchange resin," *J. Chem. Eng. Japan*, vol.32, no.6, pp.776-782, 1999.

### Book Chapters

- [1] Tajima H., 2011. "Gas Hydrate Formation Kinetics in Semi-Batch Flow Reactor Equipped with Static Mixer," *Hydrodynamics: Optimizing Methods and Tools*, InTech., pp.335-352.