JCEJ Outstanding Paper Award of 2017

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Outstanding Paper Awards Subcommittee of Journal of Chemical Engineering of Japan has assessed the 120 papers published in volume 50 in 2017, and the editorial board finally selected the five papers for JCEJ Outstanding Paper Awards of 2017; these are the papers on “Effect of Co-products on Pd Membrane Performance in Membrane Reforming of Desulfurized Kerosene,” “Classification Characteristics of a Cyclone Type Classifier with Improved Collection Boxes for Separating Particles near the Wall Surface,” “The Solubility Characteristics of Aluminum Sulfate in Sulfuric Acid Aqueous Solution in the Presence of Oxalic Acid,” “Starting Torque of Vertical Paddle Impellers,” and “Separation of Aromatic Compounds from Hydrocarbon Mixtures by Vapor Permeation Using Liquid Membranes with Ionic Liquids.”

JCEJ Paper Award is given for outstanding contribution to chemical engineering documented in a paper published in Journal of Chemical Engineering of Japan. The selection is made by means of a three-stage process consisting of nomination, first round elimination, and point rating. Outstanding Paper Awards Subcommittee of the journal has assessed the 120 papers published in 2017, corresponding to volume 50. The subcommittee selected the candidates of the award and the members of the editorial board confirmed the selection. As a result of this process, the editorial board finally determined the following five papers for the award of 2017.

1. “Effect of Co-products on Pd Membrane Performance in Membrane Reforming of Desulfurized Kerosene,” by Manabu Miyamoto, Chihiro Hayakawa, Yasunori Oumi, and Shigeyuki Uemiya, Gifu University (Miyamoto et al., 2017)

Citation: This paper concerns with hydrogen production reaction of desulfurized kerosene using a Pd membrane reformer. Improvement of conversion for heavy hydrocarbons such as kerosene or dodecane using a membrane reformer is very useful. The effects of coexisting materials on the hydrogen permeation through the Pd membrane were discussed. Discussions were convincing based on the enough experiments. One of the important conclusions was that the polycyclic aromatics were poisoning compounds to Pd membranes. This article showed great scientific contribution with practically important information for the area of the membrane reactor. Therefore, this paper deserves the Outstanding Paper Award.

2. “Classification Characteristics of a Cyclone Type Classifier with Improved Collection Boxes for Separating Particles near the Wall Surface,” by Teruo Oshitari, Kazumi Yamamoto, Kunihiro Fukui, and Hideto Yoshida, Hiroshima University (Oshitari et al., 2017)

Citation: Based on a cyclone classifier for particles larger than 10 micron, which was presented in the authors’ previous work, in this paper, the effect of a modification of a channel length in their classification device was analyzed. The performance of the cyclone classifier was investigated and some optimization conditions are obtained based on the classifying mechanisms. The results on this novel type classifier can be beneficial for the relevant industrial processes.


Citation: This article clarified the solubility characteristics of Aluminum Sulfate in Sulfuric Acid aqueous solution with and without Oxalic Acid, to propose a new recovery process applied to metal plating industry. Authors found out the optimum condition to remove and recover Aluminum Sulfate selectively, based on the solubility characteristics. Also higher concentration of Sulfuric Acid accelerated Aluminum Sulfate crystallization. They recovered Aluminum Sulfate having 94% purity as a form of Alunogen by cooling crystallization. This study gives a great contribution to the Aluminum plating industry by recovering Aluminum ion and reduce environmental impact.

4. “Starting Torque of Vertical Paddle Impellers,” by Kazuhiko Nishi, Yuma Bando, Ryuta Misumi, and Meguru Kaminoyama, Chiba Institute of Technology and Yokohama National University (Nishi et al., 2017)
Citation: In this paper, the authors investigated the starting torque in order to reveal the mechanism of the starting torque generation. They numerically and experimentally studied the effects of the rotational speed, of the number of blades and of the blade width on the starting torque of a vertical paddle impeller. They discussed the starting torque mechanism with two separated stages at the starting mixing situation and revealed the 1st starting torque was dominated with the acceleration of the impeller and the fluid density, and the 2nd one was related to the rotational speed, to the blade width and to the number of the blades. Finally, they found the relationship between the 2nd starting torque and the torque under completed baffled conditions. These findings are useful for the design of the mixing devices. There, this paper deserved the Outstanding Award Paper.

5. “Separation of Aromatic Compounds from Hydrocarbon Mixtures by Vapor Permeation Using Liquid Membranes with Ionic Liquids” by Tomoki Kamiya, Eduardo Takara, Akira Ito, Tokyo Institute of Technology (Kamiya et al., 2017)

Citation: In this paper, the authors investigate the ionic liquid (IL) membranes for the separation of C6 and C7 aromatic/aliphatic or alicyclic hydrocarbon mixtures by vapor permeation. Novel nanoparticle-supported membranes composed of four imidazolium-type ILs were successfully fabricated, which demonstrated the preferential permeation of aromatic compounds through the membranes. They found that the permeabilities of the membranes denoted similar tendencies of the solubility of the hydrocarbons in the ILs. They also showed the permeabilities were independent of the feed partial pressure, which is one of the advantages of IL membranes. Since the membrane separation of C6 and C7 hydrocarbon mixtures is the most challenging area, this work has a great potential to establish a more efficient separation process. Therefore, this paper deserves the Outstanding Paper Award.

Congratulations to all the award winners. Winners present their awarded work at the 50th Autumn Meeting of the Society of Chemical Engineers, Japan.

We would also like to acknowledge the cooperation of the Editors and the time and effort of the subcommittee members.

Literature Cited