JCEJ Outstanding Paper Award of 2012

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Outstanding Paper Award Subcommittee of Journal of Chemical Engineering of Japan has assessed the 144 papers published in volume 45 into 2012, and the editorial board finally selected the five papers for JCEJ Outstanding Paper Award of 2012; those are the papers on "Onion-Like Structure of Viscoelastic Surfactant Solution Flow Induced By 4-Blade Paddle Impeller in a Vessel," "Marangoni Flows in Polymer Solution Droplets Drying on Heating Surfaces," "Numerical Simulations of a Bubble Rising through a Shear-thickening Fluid," "Repeated Cooling Crystallization for Production of Microcrystals with a Narrow Size Distribution," and "Influence of Polymer Decomposition Temperature on the Formation of Rare-Earth Free Boron Carbon Oxynitride Phosphors."

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 Award Subcommittee of the journal has assessed the 144 papers published in 2012, corresponding to volume 45. 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 selected the following five papers for the award of 2012.

1. "Onion-Like Structure of Viscoelastic Surfactant Solution Flow Induced By 4-Blade Paddle Impeller in a Vessel" by Yoshiyuki Komoda, Kazuhiro Kobayashi, and Hiroshi Suzuki, Kobe University (Komoda et al., 2012)

Citation: This paper investigated the characteristics of the fluid flow of viscoelastic surfactant solutions in a mixing vessel by flow visualization. In the vicinity of the impeller an actively mixed onion-like structure was found. In addition, it appeared that the impeller region was covered by a network-deformed fluid and an onion-like structure was formed if the elastic force was not much smaller than the inertia force and that the onion-like structure was stable under the condition that the lowest impeller rotation speed. These results included significant new knowledge in the mixing of viscoelastic surfactant solutions. Therefore, this paper was selected as an outstanding paper.

2. "Marangoni Flows in Polymer Solution Droplets Drying on Heating Surfaces" by Shohei Yasumatsu, Kouichi Nakaso, and Jun Fukai, Kyushu University (Yasumatsu et al., 2012)

Citation: This paper experimentally and numerically examines transport phenomena in an evaporating polymer solution droplet on a heated substrate. The relative influence of each Marangoni force, thermal or solutal, on the internal droplet flow is investigated in this article. The authors demonstrate that both thermal and solutal Marangoni forces are important determining factors for the flow within an evaporating droplet. The authors’ numerical method enables one to explore the distribution of momentum, solute concentration, and temperature within a droplet. The study of transport phenomena within evaporating droplets is a difficult and practical problem and the results of this study contribute to further development in the field. Therefore this paper merits the Outstanding Paper Award.

3. "Numerical Simulations of a Bubble Rising through a Shear-thickening Fluid" by Mitsuhiro Ohta, Sachika Kimura, Tomohiro Furukawa, Yutaka Yoshida, and Mark Sussman, Muroran Institute of Technology and Florida State University (Ohta et al., 2012)

Citation: This paper presents three-dimensional computational results for single bubbles rising through shear-thickening fluids. The simulations are carried out according to a coupled level-set/volume-of-fluid (CLSVOF) method. The authors computationally show that the bubble rise velocity decreases and shape deformation of the bubble is restrained by way of the increase in viscosity resulting from the shear thickening effect. The validity of effective viscosity and effective physical dimensionless numbers are examined for bubble rise motion in the shear-thickening fluids, in addition to
their success with shear-thinning fluids. Consequently, this paper presents a unified perspective on bubble rise motion in shear-thinning and shear-thickening fluids. This achievement is considered to deserve the Outstanding Paper Award.

4. “Repeated Cooling Crystallization for Production of Microcrystals with a Narrow Size Distribution” by Zhongyuan Xing, Koichi Igarashi, Ayumi Morioka, and Hiroshi Ooshima, Osaka City University (Xing et al., 2012)

Citation: This paper proposed a novel crystallization technique to obtain fine crystals with narrow crystal size distribution (CSD). To produce fine crystals with narrow CSD a control of the timing of nucleation is important and difficult without using seed crystals. The authors attempted to control the molecular association state in a solution and then proposed the repeated cooling crystallization procedure in which the cycles of crystallization and dissolution are repeated. By repeating the cycles of cooling and heating of solution the repeated crystallization and dissolution in the solution result in the disappearance of the variation of nucleation timing by improvement of the molecular association state in a solution. There is worth of this paper in bridging between practical industrial crystallization process and fundamental scientific knowledge. Thus this paper deserves the Outstanding Paper Award.

5. “Influence of Polymer Decomposition Temperature on the Formation of Rare-Earth Free Boron Carbon Oxynitride Phosphors” by Takashi Ogi, Ferry Iskandar, Asep Bayu Dani Nandiyanto, Wei-Ning Wang, and Kikuo Okuyama, Hiroshima University, Institute Technology Bandung, and Washington University in St. Louis (Ogi et al., 2012)

Citation: This paper investigates the influence of polymer used for the preparation on the properties of boron oxynitride (BCNO) phosphors, which have been previously developed by the authors’ research group. They found that polyethyleneimine gave the phosphor particles which showed highest internal quantum efficiency and this is achieved because of its optimum decomposition temperature and high exothermic energy during the BCNO formation. The emission band can also tuned by varying the preparation conditions such as temperature and polymer concentration. The findings presented in this paper bring about improvement the properties of this new type BCNO phosphor and therefore selected as an outstanding paper.

Congratulations to all the award winners. Winners present their awarded work at the 45th 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


