



## PJ ZEON award for outstanding papers in *Polymer Journal* 2022

Keiji Tanaka, Editor-in-Chief<sup>1</sup>

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The four winners of the 2022 PJ ZEON Award have been announced by the Society of Polymer Science Japan (SPSJ) as follows:

Keiko Kobayashi (Okayama University, Japan) for the contribution ‘*Formation of Shish-like Fibril Crystals from the Melt of Blends of Cyclic and Linear Polyethylene under Shear Flow*’, Vol. 54, No. 7, 2022.

Seira Morimune-Moriya (Chubu University, Japan) for the contribution ‘*Effect of Bisphenols on the Electrical Conductivity and Structure of Poly(3,4-ethylenedioxythiophene): Poly(styrene sulfonate)*’, Vol. 54, No. 5, 2022.

Junsu Park (Osaka University, Japan) for the contribution ‘*Supramolecular Nylon-based Actuators with a High Work Efficiency Based on Host–guest Complexation and the Mechanoisomerization of Azobenzene*’, Vol. 54, No. 10, 2022.

Makoto Yamazaki (Yokohama National University, Japan) for the contribution ‘*Analysis of the Formation Mechanism of Polyion Complexes of Polysaccharides by Molecular Dynamics Simulation with Oligosaccharides*’, Vol. 54, No. 3, 2022.

Drs. Kobayashi, Morimune-Moriya, Park and Yamazaki received their award certificates and medals. Each winner also received a cash prize of 300,000 JP yen and gave an invited talk based on their respective papers.

On behalf of the editors and editorial board members of *Polymer Journal*, I wish to congratulate Drs. Kobayashi, Morimune-Moriya, Park and Yamazaki on this honor in recognition of their excellent papers [1–4]. I hope the award will provide encouragement to these young researchers for their bright future careers. Academic profiles of the winners can be found below this announcement.

The PJ ZEON Award started since 2005 as the successor of The PJ Paper Award, which started since 1992.

This PJ ZEON Award is open to all of the first author of papers published in *Polymer Journal* [5] who is under 38 years of age. We are looking forward to receiving your submissions papers and many applications for the 2023 PJ ZEON Award. Each year the SPSJ selects up to four most outstanding papers published by young authors in *Polymer Journal*, as recommended by the selection committee and board of directors of the SPSJ. Those who are interested should go to the SPSJ website (<https://main.spsj.or.jp/c5/pj/pj.htm>) for further information. Finally, we express our sincere appreciation to Zeon Corporation for their generous sponsorship of this award.

### About the winners



#### Keiko Kobayashi

Keiko Kobayashi received her master’s degree in 2014 from Okayama University and works at Daicel Corporation as a researcher. In 2020, she entered the doctoral program at Okayama University. In 2023, she received her Ph.D. degree from Okayama University (Prof. Kunio Kimura group) under the supervision of Associate Prof. Shinichi Yamazaki. Her research interests are the crystallization mechanism of blends of cyclic and linear polymers.

About the award article: the authors reported the effects of entanglement on the formation of shish-like fibril crystals of the blends of cyclic and linear polyethylene (C-PE and L-PE) in shear-induced crystallization. The formation rate of shish-like fibril crystals ( $I$ ) in the blends of C-PE with

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high  $M_w$  and L-PE with low or high  $M_w$  was measured as a function of the weight fraction of L-PE. As a result,  $I$  reached a maximum at a certain weight fraction of L-PE. As the weight fraction of L-PE increased, the formation of the oriented melt was promoted. Crystallization was also suppressed by the entanglements. The maximum value of  $I$  was observed owing to these two competing factors.



### Seira Morimune-Moriya

Seira Morimune-Moriya received her Ph.D. degree from Kobe University (Prof. Takashi Nishino) in 2013. During her Ph.D. course, she had been selected as a JSPS research fellow (DC2). In 2015, she started her academic career as an assistant professor in College of Engineering at Chubu University and was promoted to a senior assistant professor in 2018. Her research interests include the design of polymer composites/nanocomposites and polymer structures/properties.

About the award article: the authors reported the effect of bis (4-hydroxyphenyl) sulfone (BPS) on the electrical conductivity and chemical structure of poly (3,4-ethylene-dioxythiophene) doped with poly (4-styrene sulfonate) (PEDOT:PSS). The enhanced electrical conductivity of PEDOT:PSS by the addition of proper amount of BPS was revealed and the detailed mechanism were shown. The hydrogen bonds between PSS chains were partially broken by BPS, which enables excess amount of PSS to be removed. In addition, new hydrogen bonds were formed between PSS and BPS, promoting the transformation of PEDOT from benzoic structure to quinoid structure, which is the highly conductive structure.



### Junsu Park

After receiving Junsu Park's master's degree from The University of Tokyo (Prof. Naoko Yoshie group) in 2014 and

3-years military service, he received Ph.D. degree from Osaka University (Prof. Yoshinori Takashima group) in 2021. During his Ph.D. course, he had experienced a visiting scientist in The University of Texas at Austin (Prof. Nathaniel Lynd group). He had started his academic carrier in Prof. Yoshinori Takashima group's as a specially appointed assistant professor after spending 6-months as a postdoc from 2021. In 2023, he joined Prof. Jiro Abe group in Aoyama Gakuin University as an assistant professor. His research interests focus on relationship between photoresponsiveness and polymeric (structural or mechanical) properties.

About the award article: The authors reported a 6,6-nylon-based photoresponsive materials. The photoresponsive materials were cross-linked by a 1:2 complex between  $\gamma$ -cyclodextrin and azobenzene. The photoresponsive materials bent under UV light irradiation and restored their shape when UV light ceased. Abundant hydrogen bonds in the materials were considered as junctions around the azobenzene moieties and induced mechanoisomerization. Simultaneous sliding of  $\gamma$ -cyclodextrin enabled the stable photoresponsiveness.



### Makoto Yamazaki

Makoto Yamazaki received his Ph.D. degree from Yokohama National University in 2023 under the supervision of Assoc. Prof. Kazutoshi Iijima. His research interests are the polyion complexes (PICs) and their applications.

About the award article: The authors analyzed the formation mechanism of PICs of polysaccharides by molecular dynamics (MD) simulation with oligosaccharides. To evaluate the effects of ionic groups of polysaccharides on the PIC formation, protonated, deprotonated, or deacetylated chitosan as a cationic polysaccharide, and four kinds of anionic polysaccharides; chondroitin sulfate C, heparin, hyaluronic acid, and carboxymethyl cellulose were used because there are many reports about PICs with those combinations. They revealed that whether the PICs form either a ladder or scrambled egg structure depends on the chemical structures of polysaccharides. They also revealed that PICs can be stabilized by hydrogen bonds even under neutral conditions where electrostatic interactions are unlikely to occur. The simulation system could be used as a model to analyze the salt effects on the interaction between polysaccharide of PICs and material design.

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