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### **I. Education**

2016 **Ph.D./M.S.** Myongji University, South Korea (Energy and Biotechnology)  
2005 **B.S.** University of the Philippines Diliman, Philippines (Chemical Engineering)

### **II. List of SCI Publications**

1. **J.M. Puguan**, X. Yu, H. Kim, Diffusion characteristics of different molecular weight solutes in Ca-alginate gel beads, *Colloids and Surfaces A: Physicochem. Eng. Aspects*, 469, 158–165 (2015). SCI IF=4.539
2. **J.M. Puguan**, A. Chinnappan, S.V. Kostjuk, H. Kim, Zirconium dioxide nanofilled PVDF-HFP complexed with lithium trifluoromethanesulfonate as composite polymer electrolyte for electrochromic devices, *Materials Research Bulletin*, 69, 104–111 (2015). SCI IF=4.461
3. **J.M. Puguan**<sup>1</sup>, A. Chinnappan<sup>1</sup>, S.V. Kostjuk, H. Kim, Enhanced ionic conductivity and optical transmissivity of functionalized ZrO<sub>2</sub>/PVdF-HFP hybrid electrolyte for energy efficient windows, *Solar Energy Materials and Solar Cells*, 137, 265-273 (2015). SCI IF=7.270
4. A. Chinnappan<sup>1</sup>, **J.M. Puguan**<sup>1</sup>, W.J. Chung, and H. Kim, Hydrogen generation from the hydrolysis of sodium borohydride using chemically modified multiwalled carbon nanotubes with pyridinium based ionic liquid and decorated with highly dispersed Mn nanoparticles, *Journal of Power Sources*, 293, 429-436 (2015). SCI IF=8.247
5. R. Appiah-Ntiamoah, A.H. Jadhav, **J.M. Puguan**, F.W.Y. Momade, H. Kim, A silica nanoparticle supported fluorescence “turn-on” fluoride ion sensing system with tunable structure and sensitivity, *RSC Advances*, 5, 30526-30536 (2015). SCI IF=3.360
6. A. Chinnappan, A.H. Jadhav, **J. M. Puguan**, R. Appiah-Ntiamoah, and H. Kim, Fabrication of ionic liquid/polymer nanoscale networks by electrospinning and chemical cross-linking and their application in hydrogen generation from the hydrolysis of NaBH<sub>4</sub>, *Energy*, 79, 482-488 (2015). SCI IF=7.147
7. **J.M. Puguan**, X. Yu, H. Kim, Characterization of structure, physico-chemical properties and diffusion behavior of Ca-Alginate gel beads prepared by different gelation methods, *Journal of Colloids and Interface Science*, 432, 109-116 (2014). SCI IF=8.128

8. **J.M. Puguán**, H-S. Kim, K-J. Lee and H. Kim, Low internal concentration polarization in forward osmosis membranes with hydrophilic crosslinked PVA nanofibers as porous support layer, *Desalination* 336, 24-31 (2014). SCI IF=9.501
9. **J.M. Puguán**, W.J. Chung, H. Kim, Ion-conductive and transparent PVdF-HFP/silane-functionalized ZrO<sub>2</sub> nanocomposite electrolyte for electrochromic applications, *Electrochimica Acta* 196, 236–244 (2016). SCI IF=6.901
10. **J.M. Puguán**, W.J. Chung, H. Kim, Synthesis and characterization of electrospun PVdF-HFP/silane-functionalized ZrO<sub>2</sub> hybrid nanofiber electrolyte with enhanced optical and electrochemical properties, *Solid State Sciences*, 62, 34-42 (2016) SCI IF=3.059
11. **J.M. Puguán**, H. Kim, ZrO<sub>2</sub>-silane-graft-PVdFHFP hybrid polymer electrolyte: synthesis, properties and its application on electrochromic devices, *Electrochimica Acta* 196, 236-244(2016). SCI IF=6.901
12. A.R. Jadhav, **J.M. Puguán**, H. Kim, Microwave-Assisted Synthesis of a Stainless Steel Mesh-Supported Co<sub>3</sub>O<sub>4</sub> Microrod Array As a Highly Efficient Catalyst for Electrochemical Water Oxidation, *ACS Sustainable Chemistry & Engineering* 5 (11), 11069-11079 (2017). SCI IF=8.198
13. **J.M. Puguán**, A.R. Jadhav, H. Kim, Fast-switching all-solid state electrochromic device having main-chain 1, 2, 3-triazolium-based polyelectrolyte with extended oxyethylene spacer obtained via click chemistry, *Solar Energy and Solar Cells* 179 409-416 (2018). SCI IF=7.270
14. **J.M. Puguán**, L.B. Boton, H. Kim, Triazole-based ionene exhibiting tunable structure and ionic conductivity obtained via cycloaddition reaction: A new polyelectrolyte for electrochromic devices, *Solar Energy Materials and Solar Cells* 188, 210-218 (2018). SCI IF=7.270
15. **J.M. Puguán**, H. Kim, Ionene copolymer electrolyte obtained from cyclo-addition of dialkyne and di-azide monomers for solid-state smart glass windows, *Journal of Industrial and Engineering Chemistry* 74, 1-6 (2019). SCI IF=6.064
16. L. Boton, **J.M. Puguán**, M. Latif, H. Kim, Synthesis and properties of quick-drying UV-curable hyperbranched waterborne polyurethane coating, *Progress in Organic Coatings* 125, 201-206 (2018). SCI IF=5.161
17. **J.M. Puguán**, H. Kim, A Switchable Single-Molecule Electrochromic Device Derived From A Viologen-Tethered Triazolium-Based Poly(ionic liquid), *Journal of Materials Chemistry A*, 7, 21668-21673 (2019). SCI IF=12.732
18. A.G. Pornea, **J.M. Puguán**, V. Deonikar, H. Kim, Robust Janus nanocomposite membrane with opposing surface wettability for selective oil-water separation, *Separation and Purification Technology*, 236, 116297 (2020) SCI IF=7.312
19. A.G. Pornea, **J.M. Puguán**, V. Deonikar, H. Kim, Fabrication of multifunctional wax infused porous PVDF film with switchable temperature response surface and anti corrosion property, *Journal of Industrial and Engineering Chemistry*, 82, 211-219 (2020). SCI IF=6.064

20. P. Rathod, V. Deonikar, **J.M. Puguan**, H. Kim, Synthesis of biomass-based amines: Metal-free catalytic reductive amination of xylose and biomass-derived carbonyl compounds using pyridine-based ionic liquid/triethoxysilane, *Fuel*, 264, 116822 (2020). SCI IF=6.609
21. **J.M. Puguan**, H. Kim, Synthesis of free-standing poly (ionic liquid) bearing 1, 2, 3-triazole group for the adsorptive elimination of Cr<sup>6+</sup> from aqueous solution, *Journal of Environmental Chemical Engineering*, 8, 104084 (2020). SCI IF=5.909
22. V. Deonikar, P. Rathod, A.M. Pornea, **J. M. Puguan**, K. Park, H. Kim, Hydrogen generation from catalytic hydrolysis of sodium borohydride by a Cu and Mo promoted Co catalyst, *Journal of Industrial and Engineering Chemistry*, 86, 167-177 (2020). SCI IF=6.064
23. P. Rathod, **J. M. Puguan**, Hern Kim, Solvent-free synthesis of propargylamines via A3 coupling reaction and organic pollutant degradation in aqueous condition using Cu/C catalyst, *Applied Organometallic Chemistry*, 34, e5986 (2020). SCI IF=4.105.
24. V. Deonikar, **J. M. Puguan**, H. Kim, Ag nanoparticles embedded defective tungsten oxide hydrate thin films for the enhanced electrochromic performance: Insights on the physico-chemical properties and localized surface plasmon resonance mechanism, *Acta Materialia*, 207, 116693 (2021). SCI IF=8.203
25. P. Rathod, **J. M. Puguan**, H. Kim, Self-bleaching dual responsive poly(ionic liquid) with optical bistability toward climate-adaptable solar modulation, *Chemical Engineering Journal*, 422, 130065 (2021). SCI IF=13.273.
26. P. Rathod, **J. M. Puguan**, H. Kim, Phase changing poly(ionic liquid) with electrolytic functionality for single-layer ionogel based smart window with multi-stimuli response, *Solar Energy Materials and Solar Cells*, 230, 111202 (2021), SCI IF=7.270
27. **J. M. Puguan**, P. Rathod, P. More, and H. Kim, Highly Soluble electroactive ethylenedioxythiophene (EDOT)-based copolymer obtained via ‘click’ copolymerization, *Polymer*, 226, 123846 (2021). SCI IF=4.430
28. **J. M. Puguan**, P. Rathod, P. More, H. Kim, Engineered ionene/PNIPAM hybrid dual-response material generating tunable and unique optical modes for adaptive solar transmittance modulation, *ACS Applied Materials and Interfaces*, 13, 30, 36330–36340 (2021). SCI IF=9.229.
29. P. More, P. Rathod, **J. M. Puguan**, H. Kim, Novel highly stable metal-organic framework/viologen hybrid ionogel as multi-color electrochromic material for display application, *Dyes and Pigments*, 195, 109730 (2021). SCI IF=4.889.

### III. International/National Conference Proceedings/Papers

- [1] **J.M. Puguan**, H. Kim, Polyvinyl alcohol membrane with surface immobilized  $\beta$ -cyclodextrin synthesis via glutaraldehyde (Advanced Materials Research, Beijing, China, 2013)

- [2] **J. M. Puguán**, H. Kim, Zirconium dioxide nanofilled poly(vinylidene fluoride-hexafluoropropylene) complexed with lithium trifluorosulfonate as composite polymer electrolyte for electrochromic devices (ISFM, Singapore, 2014)
- [3] **J.M. Puguán**, H. Kim, Functionalized ZrO<sub>2</sub> nanofilled PVdF-HFP for enhanced ionic conductivity and optical transmissivity of organic-inorganic hybrid electrolyte membranes (Korean Society of Industrial Engineering and Chemistry, Busan, Korea, 2015)
- [4] **J.M. Puguán**, H. Kim, Electrochromic devices incorporating organic-inorganic hybrid electrolyte doped with IPTES-functionalized ZrO<sub>2</sub> nanoparticles (Korean Society of Industrial Engineering and Chemistry, Jeju, South Korea, 2015)
- [5] **J.M. Puguán**, H. Kim, Immobilized ZrO<sub>2</sub> on PVDF-HFP via silane functional group as novel electrolyte for SMART windows, (ISSCER, Seoul, South Korea, 2016)
- [6] **J.M. Puguán**, H. Kim, Clickable synthesis of 1,2,3-triazolium poly(ionic liquid) for the selective removal of hexavalent chromium, (2017 International Environmental Engineering Conference (IEEC) Jeju South Korea, November 15-17, 2017)
- [7] **J.M. Puguán**, L.B. Botton, H. Kim, Ionene-based polyelectrolytes and their electrochemical application in smart windows (2018 International Science Congress of Materials and Polymers (ISCOMP), Durres, Albania, November 9-12, 2018)
- [8] **J.M. Puguán**, L.B. Botton, H. Kim, Poly(ionic liquid) electrolyte bearing dicationic monomer based on 1,2,3-triazolium for efficient electrochromic displays (2018 International Environmental Engineering Conference (IEEC) Jeju South Korea, October 31-November 2, 2018)
- [9] L.B. Botton, **J.M. Puguán**, Synthesis of poly (ionic liquid) electrolytes with tetraethylene glycol spacer and the effect of different fluorinated salts on its physical and electrochemical properties (2018 International Environmental Engineering Conference (IEEC) Jeju South Korea, October 31-November 2, 2018)
- [10] **J.M. Puguán**, L.B. Botton, H. Kim, Block copolymer electrolyte synthesized via ‘click’ chemistry for efficient all-solid state electrochromic devices (2018 International Conference on Materials Technology and Applications (ICMTA), Sapporo, Japan, September 26-29, 2018)
- [11] **J.M. Puguán**, L.B. Botton, H. Kim, Triazole-based dicationic ionene obtained via cycloaddition reaction exhibiting enhanced and tunable ionic conductivity as electrolyte for all-solid state electrochromic devices (2018 International Conference on Functional Materials (ICFM), Shanghai, China, September 15-17, 2018)
- [12] **J.M. Puguán**, H. Kim, Main-chain polyelectrolyte based on 1,2,3-triazolium with pentaethylene oxide spacer obtained via ‘click’ chemistry for all-solid state electrochromic device applications (2018 Materials Research and Technology, Paris, France, February 18-20, 2018)

- [13] **J.M. Puguán, H. Kim,** Electro-responsive poly(ionic liquid) having tunable multichromism as smart material for fast-switching all-solid state electrochromic displays (2019 Korean Society of Industrial Engineering and Chemistry Spring Meeting, Busan, South Korea, May 1-3, 2019)
- [14] **J.M. Puguán, H. Kim,** A fast-switching single-molecule smart window derived from a viologen-functionalized triazolium-based ionene (International Conference on Nano and Materials Science. Seattle, WA, USA, January 17-20, 2020) **AWARDED as BEST ORAL Presenter.**
- [15] **J.M. Puguán, H. Kim,** Ethylenedioxythiophene (EDOT)-based copolymer obtained via ‘click’ synthesis as electroactive material with high solubility and fast response (Korean Institute of Chemical Engineers (KICChE) 2020 Fall Meeting, Yeosu, South Korea, October 14-16, 2020)
- [16] **J.M. Puguán, H. Kim,** Autonomous control dual-response soft-matter hybrid for adaptive modulation of solar transmittance in an all-in-one smart device (€-MRS Spring Meeting 2021-Virtual Conference, May 31-June 4 2021)
- [17] **J.M. Puguán, H. Kim,** Thermo- and Electro- Dual Responsive Soft Hybrid Material Producing Tunable Optical States for Adaptive Control of Incoming Solar Light (Korean Society of Industrial and Engineering Chemistry (KSIEC) 2021 Spring Meeting, BEXCO Busan, South Korea, May 12-14, 2021)
- [18] **J.M. Puguán, H. Kim,** Nanofibrous aerogels derived from waste PET bottles for enhanced acoustic absorption and insulation (The Polymer Society of Korea Fall Meeting, Gyeongju South Korea, October 20-22, 2021)

#### **IV. Research Grants/Fundings**

- [1] **National Research Foundation of Korea (NRF) funded by the Ministry of Science and ICT (MSIT) 2017R1C1B5017539,** Development of electro-responsive poly(ionic liquid)s via click chemistry polyaddition and its use as new generation SMART window
- [2] **National Research Foundation of Korea (NRF) funded by the Ministry of Education (2019R1F1A1058732),** Multicolor electro- and thermochromic triblock copolymer loaded with photothermotropic nanoparticles toward smart and climate adaptable solar modulation