

Jong Keum

Neutron Scattering Scientist

Neutron Scattering Division/Center for Nanophase Materials Sciences

Oak Ridge National Laboratory

Education

- **PhD in Chemistry**, 9/2004-9/2007
State University of New York at Stony Brook
- **MS in Chemistry**, 9/2002-9/2004
State University of New York at Stony Brook

Experiences

- **Oak Ridge National Laboratory** 1/2013 – CURRENT
Neutron Scattering Scientist, Neutron Scattering Division/Center for Nanophase Materials Sciences
- **Oak Ridge National Laboratory** 8/2010 – 1/2013
Post Doctorate, Neutron Science Directorate
- **Case Western Reserve University** 1/2008 - 8/2010
Post Doctorate, Macromolecular Science & Engineering

Research Interests

- Application of small-angle and wide-angle neutron/X-ray scattering (SANS/SAXS/WANS/WAXS) to studying structure of soft matters and nanomaterials in solution, bulk and thin film
- 1D and 2D X-ray scattering/diffraction modeling and model refinement.
- Processing-structure-electronic property of polymers and polymer nanocomposites
- Physics of polymer crystallization/phase separation in solution and thin film
- Polymers, polymer nanocomposites and liquid crystals
- Organic electronics

Skills

- SANS, NR, XRD, XRR, (GI-) SAXS, (GI-) WAXS, powder/thin film XRD and Laue machine
- In-house SAXS instrumentation (Kratky and 3-pinhole camera).
- Wolfram Mathematica for scattering/reflectivity modeling and refinement.
- Igor Pro for data reduction/analysis.
- Thermal analysis: DSC and TGA.

Funding, Awards and Honors

- “Honoree of Research Accomplishment”, 2019 UT-Battelle Awards Night program.
- “Surpassing Stiffness-Extensibility Trade-off in Elastomers” FY20 Laboratory Directed Research and Development (LDRD) Fund (Co-PI).
- “Understanding rheology of fiber reinforced soft matter structural composites: From microscopic structures to macroscopic mechanical properties”. FY17 Laboratory Directed Research and Development (LDRD) Fund (Co-PI).
- “Rational design of deuterated conjugated polymers with controlled spin polarized electron transport” FY16 Laboratory Directed Research and Development (LDRD) Fund (PI).
- “Distinguished Scientific Paper” (2014), Center for Nanophase Materials Sciences (CNMS), Oak Ridge National Laboratory.
- “Excellence in Doctoral Research” (2008), State University of New York at Stony Brook.

Professional Memberships

- American Physical Society
- American Chemical Society
- Materials Research Society
- American Vacuum Society
- American Conference on Neutron Scattering

Journal papers (112)

1. “Uniform Permutation of Quasi-2D Perovskites by Vacuum Poling for Efficient, High-Fill-Factor Solar Cells”, Jia Zhang, Jiajun Qin, Miaosheng Wang, Yujie Bai, Han Zou, Jong Kahk Keum, Runming Tao, Hengxing Xu, Haomiao Yu, Stefan Haacke, Bin Hu, Joule, In Press (2019).
2. “Light-Ferroic Interaction in Hybrid Organic–Inorganic Perovskites”, Yongtao Liu, Anton V. Ievlev, Liam Collins, Nikolay Borodinov, Alex Belianinov, Jong K. Keum, Miaosheng Wang, Mahshid Ahmadi, Stephen Jesse, Kai Xiao, Bobby G. Sumpter, Bin Hu, Sergei V. Kalinin, Olga S. Ovchinnikova, *Advanced Optical Materials*, 1901451 (2019).
3. “Damage-Free Nanoscale Isotopic Analysis of Biological Materials with Vibrational Electron Spectroscopy”, Jordan A Hachtel, Jingsong Huang, Ilja Popovs, Santa Jansone-Popova, Jong K Keum, Jacek Jakowski, Tracy C Lovejoy, Niklas Dellby, Ondrej L Krivanek, Juan Carlos Idrobo, *Microscopy and Microanalysis* 25 (S2), 1088-1089 (2019).
4. “A fundamental understanding of whole biomass dissolution in ionic liquid for regeneration of fiber by solution-spinning”, Ngoc A. Nguyen, Keonhee Kim, Christopher. Bowland, Jong K. Keum, Logan T. Kearney, Nicolas André, Nicole Labbé, Amit K. Naskar. *Green Chemistry* 21, 4354-4367, (2019).
5. “An Ionomeric Renewable Thermoplastic from Lignin-Reinforced Rubber”, Sietske H Barnes, Monojoy Goswami, Ngoc A Nguyen, Jong K Keum, Christopher C Bowland, Jihua Chen, Amit K Naskar, *Macromolecular rapid communications*, Accepted (2019)
6. “Strain engineering 4H-SiC with ion beams”, FX Zhang, Yang Tong, Haizhou Xue, Jong K Keum, Yanwen Zhang, Alexandre Boule, Aurelien Debelle, William J Weber, *Applied Physics Letters* 114

- (22), 221904 (2019).
7. "Alternating crystalline lamellar structures from thermodynamically miscible Poly (ϵ -caprolactone) H/D blends", Lengwan Li, Matthias ML Arras, Tianyu Li, Wei Li, Dongsook Chang, Jong K Keum, Peter V Bonnesen, Shuo Qian, Xiangfang Peng, Byeongdu Lee, Kunlun Hong, *Polymer* 175 (26), 320-328 (2019).
 8. "Isotope Effects on the Crystallization Kinetics of Selectively Deuterated Poly (ϵ -Caprolactone)", Lengwan Li, Dongsook Chang, Matthias ML Arras, Wei Li, Tianyu Li, Jong K Keum, Peter V Bonnesen, Xiangfang Peng, Kunlun Hong, *Journal of Polymer Science Part B: Polymer Physics* 57, 771-779 (2019).
 9. "Cation Molecular Structure Affects Mobility and Transport of Electrolytes in Porous Carbons", Naresh C Osti, Boris Dyatkin, Alejandro Gallegos, David Vonshen, Jong K Keum, Ken Littrell, Pengfei Zhang, Sheng Dai, Jianzhong Wu, Yury Gogotsi, Eugene Mamontov, *Journal of The Electrochemical Society* 166 (4), A507-A526 (2019).
 10. "Efficient solar-thermal distillation desalination device by light absorptive carbon composite porous foam", Gyoung Gug Jang, James William Klett, Joanna McFarlane, Anton Ievlev, Kai Xiao, Jong K. Keum, Mina Yoon, Piljae Im, Michael Z. Hu, James E. Parks II, *Global Challenges*, 1900003 (2019).
 11. "Effect of electronic energy dissipation on strain relaxation in irradiated concentrated solid solution alloys", Neila Sellami, Aurélien Debelle, Mohammad W. Ullah, Hans M. Christen, Jong K. Keum, Hongbin Bei, Haizhou Xue, William J. Weber, Yanwen Zhang. *Current Opinion in Solid State & Materials Science* 23 (12), 107-115 (2019).
 12. "Identification of Site-Specific Isotopic Labeling in Amino Acids by Vibrational Spectroscopy in the Electron Microscope", Jordan A. Hachtel, Jingsong Huang, Ilya Popovs, Santa Jansone-Popova, Jong K. Keum, Jacek Jakowski, Tracy C. Lovejoy, Niklas Dellby, Ondrej L. Krivanek, and Juan Carlos Idrobo, *Science* 363 (6426), 525-528 (2019)
 13. "Side Chain Dynamics in Semi-Conducting Polymer MEH-PPV", Naresh C. Osti, Eugene Mamontov, Luke Daemen, James F. Browning, Jong Keum, Hoi Chun Ho, Jihua Chen, Kunlun Hong, Souleymane O. Diallo, *Journal of Applied Polymer Science* 136, 47394 (2019).
 14. "Transparent superhydrophilic and superhydrophobic nanoparticle textured coatings: Comparative study of anti-soiling performance", Gyoung Gug Jang, D Barton Smith, Georgios Polizos, Jong Keum, Liam Collins, Dominic F. Lee, *Nanoscale Advances* 1, 1249-1260 (2019).
 15. "Amphiphilic Bottlebrush Block Copolymers: Analysis of Aqueous Self-Assembly by Small Angle Neutron Scattering and Surface Tension Measurements", Mohammed Alaboalirat, Luqing Qi, Kyle Arrington, Shuo Qian, Jong Keum, Hao Mei, Kenneth Littrell, Bobby Sumpter, Jan-Michael Carrillo, Rafael Verduzco, John Matson, *Macromolecules* 52 (2), 465-476 (2018).
 16. "A path for lignin valorization via additive manufacturing of high-performance sustainable composites with enhanced 3D-printability", Ngoc A. Nguyen, Sietske H. Barnes, Christopher C. Bowland, Kelly M. Meek, Kenneth C. Littrell, Jong K. Keum, and Amit K. Naskar, *Science Advances* 4 (12), eaat4967 (2018).
 17. "Selectively Deuterated Poly(ϵ -caprolactone)s: Synthesis and Isotope Effects on the Crystal Structures and Properties" Dongsook Chang, Tianyu Li, Lengwan Li, Jacek Jakowski, Jingsong Huang, Jong Keum, Byeongdu Lee, Peter Bonnesen, Mi Zhou, Sophia Garashchuk, Bobby Sumpter, Kunlun Hong, *Macromolecules* 51(22), 9393 (2018).
 18. "Humidity Exposure Enhances Microscopic Mobility in a Room-Temperature Ionic Liquid in MXene", Naresh C. Osti, Matthew W. Thompson, Katherine L. Van Aken, Mohamed Alhabeib, Madhusudan Tyagi, Jong-Kahk Keum, Peter T. Cummings, Yury Gogotsi, Eugene Mamontov, *The Journal of Physical Chemistry Part: Part C* 122 (48), 27561 (2018).
 19. "Rheology, crystal structure, and nanomechanical properties in large-scale additive manufacturing

- of polyphenylene sulfide/carbon fiber composites”, Peng Liu, Ralph B Dinwiddie, Jong K Keum, Rama K Vasudevan, Stephen Jesse, Ngoc A Nguyen, John M Lindahl, Vlastimil Kunc, *Composites Science and Technology* 168, 263 (2018).
20. “Dissimilar Materials Joining of Carbon Fiber Polymer to Dual Phase 980 by Friction Bit Joining, Adhesive Bonding, and Weld bonding”, Yong Lim, Hoon mo Park, Junho Jang, Jake McMurray, Bradly Lokitz, Jong Keum, Zheng gang Wu, Zhili Feng, *Metals* 8 (11), 865 (2018).
 21. “Revealing the Structural Stability and Na-Ion Mobility of 3D Superionic Conductor Na₃SbS₄ at Extremely Low Temperatures”, Hui Wang, Yan Chen, Zachary D Hood, Jong K Keum, Amaresh Samuthira Pandian, Miaofang Chi, Ke An, Chengdu Liang, Mahendra K Sunkara, *ACS Applied Energy Materials* 1(12), 7028 (2018).
 22. “Rigid Oligomer from Lignin in Designing of Tough, Self-Healing Elastomers”, Mengmeng Cui, Ngoc A Nguyen, Peter V Bonnesen, David Uhrig, Jong K Keum, Amit K Naskar, *ACS Macro Letters* 7, 1328 (2018).
 23. “Amending the Structure of Renewable Carbon from Biorefinery Waste-Streams for Energy Storage Applications”, Hoi Chun Ho, Monojoy Goswami, Jihua Chen, Jong K. Keum, Amit K. Naskar, *Scientific reports* 8 (1), 8355 (2018).
 24. “Surprisingly Selective Sulfate Extraction by a Simple Monofunctional Di(imino)guanidinium Micelle-Forming Anion Receptor”, Neil Williams, Charles Seipp, Kathleen Garrabrant, Radu Custelcean, Erick Holguin, Jong Keum, Ross Ellis, Bruce Moyer, *ChemComm* 54 (72), 10048 (2018).
 25. “Secondary-Structure-Mediated Hierarchy and Mechanics in Polyurea–Peptide Hybrids”, Lindsay E Matolyak, Chase B Thompson, Bingrui Li, Jong K Keum, Jonathan E Cowen, Richard S Tomazin, LaShanda TJ Korley, *Biomacromolecules* 19 (8), 3445 (2018).
 26. “Real-Time Observation of Order-Disorder Transformation of Organic Cations Induced Phase Transition and Anomalous Photoluminescence in Hybrid Perovskites”, Bin Yang, Wenmei Ming, Mao-Hua Du, Jong K Keum, Alexander A Puzos, Christopher M Rouleau, Jinsong Huang, David B Geohegan, Xiaoping Wang, Kai Xiao. *Advanced Materials* 30 (22), 1705801 (2018).
 27. “Amending the Structure of Renewable Carbon from Biorefinery Waste-Streams for Energy Storage Applications”, Hoi Chun Ho, Monojoy Goswami, Jihua Chen, Jong K Keum, Amit K Naskar. *Scientific Reports* 8 (1), 8355 (2018).
 28. “Origin of dielectric relaxor behavior in PVDF-based copolymer and terpolymer films”, Abhijit Pramanick, Naresh C Osti, Niina Jalarvo, Scott T Misture, Souleymane Omar Diallo, Eugene Mamontov, Y Luo, Jong-Kahk Keum, Ken Littrell. *AIP Advances* 8 (4), 045204 (2018).
 29. “Exploring Anomalous Polarization Dynamics in Organometallic Halide Perovskites”, Mahshid Ahmadi, Liam Collins, Alexander Puzos, Jia Zhang, Jong Kahk Keum, Wei Lu, Ilia Ivanov, Sergei V Kalinin, Bin Hu. *Advanced Materials* 30 (11), 1705801 (2018).
 30. “Enhancing the Efficiency of Organic Photovoltaics by a Photoactive Molecular Mediator”, Bin Yang, Matthew A Kolaczowski, Michael A Brady, Jong K. Keum, James F Browning, Teresa L Chen, Yi Liu. *Solar RRL* 2 (2018).
 31. “In Situ X-Ray Studies of Crystallization Kinetics and Ordering in Functional Organic and Hybrid Materials”, Bin Yang, Jong K. Keum, David B. Geohegan, and Kai Xiao. *In-situ Characterization Techniques for Nanomaterials*, 33-60, Springer-Verlag Berlin Heidelberg (2018).
 32. “Microscopic vertical orientation of nano-interspaced graphene architectures in deposit films as electrodes for enhanced supercapacitor performance”, Jang, Gyoung Gug; Song, Bo; Li, Liyi; Keum, Jong Kahk; Jiang, Yongdong; Hunt, Andrew; Moon, Kyoung-sik; Wong, Ching-Ping; Hu, Michael Z; *Nano Energy* 32, 88-95 (2017).
 33. “Nanoporous poly (3-hexylthiophene) thin film structures from self-organization of a tunable molecular bottlebrush scaffold”, Ahn, Suk-kyun; Carrillo, Jan-Michael Y; Keum, Jong K; Chen,

- Jihua; Uhrig, David; Lokitz, Bradley S; Sumpter, Bobby G; Kilbey, S Michael; *Nanoscale* 9, 21, 7071-7080 (2017).
34. "One-step Synthesis of Nb₂O₅/C/Nb₂C (MXene) Composites and Their Use as Photocatalysts for Hydrogen Evolution", Tongming Su, Rui Peng, Zachary D Hood, Michael Naguib, Ilia N Ivanov, Jong Kahk Keum, Zuzeng Qin, Zhanhu Guo, Zili Wu. *ChemSusChem* 11 (4), 2018 (DOI: 10.1002/cssc.201702317).
 35. "Particle size effect in porous film electrodes of ligand-modified graphene for enhanced supercapacitor performance", Jang, Gyoung Gug; Song, Bo; Moon, Kyoung-sik; Wong, Ching-Ping; Keum, Jong K; Hu, Michael Z; *Carbon* 119, 296-304 (2017).
 36. "Sustainable Energy-Storage Materials from Lignin–Graphene Nanocomposite-Derived Porous Carbon Film", Tran, Chau D; Ho, Hoi Chun; Keum, Jong K; Chen, Jihua; Gallego, Nidia C; Naskar, Amit K.; *Energy Technology* 5, 1927-1935 (2017).
 37. "Unrivaled Combination of Surface Area and Pore Volume in Micelle Templated Carbon for Supercapacitor Energy Storage", Pokrzywinski, Jesse; Keum, Jong; Ruther, Rose Emily; Self, Ethan C; Chi, Miaofang; Meyer, Harry; Littrell, Kenneth C; Aulakh, Darpandeep; Marble, Sam; Ding, Jia; *Journal of Materials Chemistry A* 5, 13511-13525 (2017).
 38. "Corrosion behaviour of friction-bit-joined and weld-bonded AA7075-T6/galvannealed DP980", Lim, Yong Chae; Squires, Lile; Pan, Tsung-Yu; Miles, Michael; Keum, Jong Kahk; Song, Guang-Ling; Wang, Yanli; Feng, Zhili; *Science and Technology of Welding and Joining* 22, 6, 455-464 (2017).
 39. "Liquid Crystalline Epoxy Networks with Exchangeable Disulfide Bonds", Li, Yuzhan; Zhang, Yuehong; Rios, Orlando; Keum, Jong; Kessler, Michael; *Soft Matter* 13, 5021-5027 (2017).
 40. "Quantitative analysis of the morphology of {101} and {001} faceted anatase TiO₂ nanocrystals and its implication on photocatalytic activity", Liu, Jue; Olds, Daniel; Peng, Rui; Yu, Lei; Foo, Guo Shiou; Qian, Shuo; Keum, Jong; Guiton, Beth S; Wu, Zili; Page, Katharine; *Chemistry of Materials* 29 (13), 5591–5604 (2017).
 41. "Controlled Assembly of Lignocellulosic Biomass Components and Properties of Reformed Materials", Wang, Jing; Boy, Ramiz; Nguyen, Ngoc A; Keum, Jong; Cullen, David A; Chen, Jihua; Soliman, Mikhael; Littrell, Kenneth C; Harper, David P; Tetard, Laurene; *ACS Sustainable Chemistry & Engineering*, (2017).
 42. "Photo-responsive liquid crystalline epoxy networks with exchangeable disulfide bonds", Li, Yuzhan; Zhang, Yuehong; Rios, Orlando; Keum, Jong K; Kessler, Michael R; *RSC Advances* 7, 59, 37248-37254 (2017).
 43. "Determination of active layer morphology in all-polymer photovoltaic cells", Mulderig, Andrew J; Jin, Yan; Yu, Fei; Keum, Jong; Hong, Kunlun; Browning, James F; Beaucage, Gregory; Smith, GS; Kuppa, VK; *Journal of Applied Crystallography* 50. 5. (2017). "Synthetic approach to tailored physical associations in peptide-polyurea/polyurethane hybrids", LE Matolyak, JK Keum, KM Van de Voorde, LTJ Korley. *Organic & biomolecular chemistry* 15, 7607-7617 (2017)
 44. "Deuteration as a Means to Tune Crystallinity of Conducting Polymers", Jakowski, Jacek; Huang, Jingsong; Garashchuk, Sophia; Luo, Yingdong; Hong, Kunlun; Keum, Jong; Sumpter, Bobby; *The Journal of Physical Chemistry Letters* 8, 4333-4340 (2017).
 45. "High conducting oxide—sulfide composite lithium superionic conductor", Liang, Chengdu; Rangasamy, Ezhiylmurugan; Dudney, Nancy J; Keum, Jong Kahk; Rondinone, Adam Justin; 2017 US Patent 9,548,512.
 46. "Molecular Design: Network Architecture and Its Impact on the Organization and Mechanics of Peptide-Polyurea Hybrids", Lindsay Matolyak, Jong Keum, and LaShanda T. J. Korley. *Biomacromolecules* 17 (12), 3931–3939 (2016).
 47. "Polymer matrix nanocomposites for automotive structural components", Amit K. Naskar, Jong K.

- Keum, Raymond G. Boeman. *Nature Nanotechnology* 11, 1026–1030 (2016).
48. “In situ neutron scattering study of nanoscale phase evolution in PbTe-PbS thermoelectric material”, Ren, Fei; Schmidt, Robert; Keum, Jong K; Qian, Bosen; Case, Eldon D; Littrell, Ken C; An, Ke; *Applied Physics Letters* 109 (8), 81903: 1-4 (2016).
 49. “Epitaxial stabilization and phase instability of VO₂ polymorphs”, Lee, Shinbuhm; Ivanov, Iliia N; Keum, Jong K; Lee, Ho Nyung; *Scientific reports* 6, 19621:1-7 (2016).
 50. “Nanophase Engineering of Organic Semiconductor-Based Solar Cells”, Yang, Bin; Shao, Ming; Keum, Jong; Geohegan, David; Xiao, Kai; Springer International Publishing; *Semiconductor Materials for Solar Photovoltaic Cells*, 197-228 (2016).
 51. “Fluorinated bottlebrush polymers based on poly (trifluoroethyl methacrylate): synthesis and characterization”, Xu, Yuwen; Wang, Weiyu; Wang, Yangyang; Zhu, Jiahua; Uhrig, David; Lu, Xinyi; Keum, Jong K; Mays, Jimmy W; Hong, Kunlun; *Polymer Chemistry* 7(3), 680-688 (2016).
 52. “Insights into the Morphology and Kinetics of Growth of Silver Metal–Organic Nanotubes”, Etampawala, Thusitha; Mull, Derek L; Keum, Jong K; Jenkins, David M; Dadmun, Mark; *Crystal Growth & Design* 16 (3), 1395-1403 (2016).
 53. “Li₂OHCl Crystalline Electrolyte for Stable Metallic Lithium Anodes”, Hood, Zachary D; Wang, Hui; Samuthira Pandian, Amaresh; Keum, Jong Kahk; Liang, Chengdu; *Journal of the American Chemical Society* 138 (6), 1768-1771 (2016).
 54. X-ray and Neutron Scattering Study of the Formation of Core–Shell-Type Polyoxometalates”, Yin, Panchao; Wu, Bin; Mamontov, Eugene; Daemen, Luke L; Cheng, Yongqiang; Li, Tao; Seifert, Soenke; Hong, Kunlun; Bonnesen, Peter V; Keum, Jong Kahk; *Journal of the American Chemical Society* 138 (15), 2638-2643 (2016).
 55. “Deciphering Halogen Competition in Organometallic Halide Perovskite Growth”, Yang, Bin; Keum, Jong; Ovchinnikova, Olga S; Belianinov, Alex; Chen, Shiyu; Du, Mao-Hua; Ivanov, Iliia N; Rouleau, Christopher M; Geohegan, David B; Xiao, Kai; *Journal of the American Chemical Society* 138 (15), 5028-5035 (2016).
 56. “A New Class of Renewable Thermoplastics with Extraordinary Performance from Nanostructured Lignin-Elastomers”, Tran, Chau D; Chen, Jihua; Keum, Jong K; Naskar, Amit K; *Advanced Functional Materials* 26 (16), 2677-2685 (2016).
 57. “Photo-responsive Liquid Crystalline Epoxy Networks with Shape Memory Behavior and Dynamic Ester Bonds”, Li, Yuzhan; Rios, Orlando; Keum, Jong K; Chen, Jihua; Kessler, Michael R; *ACS applied materials & interfaces* 8 (24), 15750–15757 (2016).
 58. “An Air-Stable Na₃SbS₄ Superionic Conductor Prepared by a Rapid and Economic Synthetic Procedure”, Wang, Hui; Chen, Yan; Hood, Zachary D; Sahu, Gayatri; Pandian, Amaresh Samuthira; Keum, Jong Kahk; An, Ke; Liang, Chengdu; *Angewandte Chemie International Edition* 55 (30), 8551–8555 (2016).
 59. “Reduction-Triggered Self-Assembly of Nanoscale Molybdenum Oxide Molecular Clusters”, Yin, Panchao; Wu, Bin; Li, Tao; Bonnesen, Peter V; Hong, Kunlun; Seifert, Soenke; Porcar, Lionel; Do, Changwoo; Keum, Jong Kahk; *Journal of the American Chemical Society* 138 (33), 10623-10629 (2016).
 60. Konstantinos Misichronis, Jihua Chen, Jong K Kahk, Adam Imel, Mark Dadmun, Kunlun Hong, Nikos Hadjichristidis, Jimmy W Mays, Apostolos Avgeropoulos; “Diblock copolymers of polystyrene-b-poly (1, 3-cyclohexadiene) exhibiting unique three-phase microdomain morphologies”, *Journal of Polymer Science Part B: Polymer Physics* 54 (16), 1564-1572 (2016).
 61. “Correlating High Power Conversion Efficiency of PTB7:PC71BM Inverted Organic Solar Cells to Nanoscale Structure”. Sanjib Das, Jong K. Keum, James F. Browning, Gong Gu, Bin Yang, Ondrej Dyck, Changwoo Do, Wei Chen, Jihua Chen, Iliia N. Ivanov, Kunlun Hong, Adam J. Rondinone,

- Pooran C. Joshi, David B. Geohegan, Gerd Duscher, Kai Xiao. *Nanoscale* 7, 15576 (2015)
62. "Controllable Growth of Perovskite Films by Room-Temperature Air Exposure for Efficient Planar Heterojunction Photovoltaic Cells". Bin Yang, Ondrej Dyck, Jonathan Poplawsky, Jong K Keum, Sanjib Das, Alexander Poretzky, Tolga Aytug, Pooran C Joshi, Christopher M Rouleau, Gerd Duscher, David B Geohegan, Kai Xiao. *Angewandte Chemie International Edition* 54, 14862 (2015)
 63. "Perovskite Solar Cells with Near 100% Internal Quantum Efficiency Based on Large Single Crystalline Grains and Vertical Bulk Heterojunctions". Bin Yang, Ondrej Dyck, Jonathan Poplawsky, Jong Keum, Alexander Poretzky, Sanjib Das, Ilia N Ivanov, Christopher M Rouleau, Gerd Duscher, David B Geohegan, Kai Xiao. *Journal of the American Chemical Society* 137,9210 (2015)
 64. "Enhancement in Organic Photovoltaic Efficiency through the Synergistic Interplay of Molecular Donor Hydrogen Bonding and π -Stacking". Nathan T Shewmon, Davita L Watkins, Johan F Galindo, Raghida Bou Zerdan, Jihua Chen, Jong Keum, Adrian E Roitberg, Jiangeng Xue, Ronald K Castellano. *Advanced Functional Materials* 25, 5166 (2015).
 65. "The electrochemical reactions of SnO₂ with Li and Na: A study using thin films and mesoporous carbons". Joanna Górká, Loïc Baggetto, Jong K Keum, Shannon M Mahurin, Richard T Mayes, Sheng Dai, Gabriel M Veith. *Journal of Power Sources* 284, 1 (2015)
 66. "Controlled Shape Memory Behavior of a Smectic Main-Chain Liquid Crystalline Elastomer". Yuzhan Li, Cole Pruitt, Orlando Rios, Liqing Wei, Mitch Rock, Jong K Keum, Armando G McDonald, Michael R Kessler. *Macromolecules* 48, 2864 (2015)
 67. "Quantitative Phase Fraction Detection in Organic Photovoltaic Materials through EELS Imaging". Ondrej Dyck, Sheng Hu, Sanjib Das, Jong Keum, Kai Xiao, Bamin Khomami, Gerd Duscher. *Polymers* 7, 2446 (2015).
 68. "Strong and Electrically Conductive Graphene Based Composite Fibers and Laminates". Ivan V Vlassiuk, Georgios Polizos, Ryan Cooper, Ilia N Ivanov, Jong K Keum, Felix Paulauskas, Panos G Datskos, Sergei N Smirnov. *ACS applied materials & interfaces* 7, 10702 (2015)
 69. "Peculiarity of Two Thermodynamically-Stable Morphologies and Their Impact on the Efficiency of Small Molecule Bulk Heterojunction Solar Cells". Nuradhika Herath, Sanjib Das, Jong Keum, Jiahua Zhu, Rajeev Kumar, Ilia Ivanov, Bobby Sumpter, James Browning, Kai Xiao, Gong Gu, Pooran Joshi, and Valeria Lauter. *Scientific Reports* 5, Article Number 13407 (2015). doi:10.1038/srep13407.
 70. "Reciprocated suppression of polymer crystallization toward improved solid polymer electrolytes: Higher ion conductivity and tunable mechanical properties". Sheng Bi, Che-Nan Sun, Thomas A Zawodzinski, Fei Ren, Jong Kahk Keum, Suk-Kyun Ahn, Dawen Li, Jihua Chen. *Journal of Polymer Science Part B: Polymer Physics* 53, 1450 (2015)
 71. "Nanostructure enhanced ionic transport in fullerene reinforced solid polymer electrolytes". Che-Nan Sun, Thomas A Zawodzinski, Wyatt E Tenhaeff, Fei Ren, Jong Kahk Keum, Sheng Bi, Dawen Li, Suk-Kyun Ahn, Kunlun Hong, Adam J Rondinone, Jan-Michael Y Carrillo, Changwoo Do, Bobby G Sumpter, Jihua Chen. *Physical Chemistry Chemical Physics* 17, 8266 (2015)
 72. "Translational diffusion of water inside hydrophobic carbon micropores studied by neutron spectroscopy and molecular dynamics simulation". SO Diallo, L Vlcek, E Mamontov, Jong K. Keum, Jihua Chen, JS Hayes Jr, AA Chialvo. *Physical Review E*. 91, 022124 (2015)
 73. "Understanding how processing additives tune nanoscale morphology of high efficiency organic photovoltaic blends: From casting solution to spun-cast thin film". Ming Shao, Jong Kahk Keum, Rajeev Kumar, Jihua Chen, James F. Browning, Wei Chen, Jianhui Hou, Changwoo Do, Kenneth C. Littrell, Sanjib Das, Adam Rondinone, David B. Geohegan, Bobby G. Sumpter, Kai Xiao. *Advanced Functional Materials* 24, 6647 (2014).

74. "The reaction mechanism of SnSb and Sb thin film anodes for Na-ion batteries studied by X-ray diffraction, ^{119}Sn and ^{121}Sb Mössbauer spectroscopies". Loïc Baggetto, Hien-Yoong Hah, Jean-Claude Jumas, Charles E. Johnson, Jacqueline A. Johnson, Jong K. Keum, Craig A. Bridges, Gabriel M. Veith. *Journal of Power Source* 267, 329 (2014).
75. "Improving performance of TIPS pentacene-based organic thin film transistors with small-molecule additives". Zhengran He, Jihua Chen, Jong Kahk Keum, Greg Szulczewski, Dawen Li. *Organic Electronics* 15 (1), 150 (2014).
76. "The isotopic effects of deuteration on optoelectronic properties of conducting polymers." Ming Shao, Jong Keum, Jihua Chen, Youjun He, Wei Chen, James F Browning, Jacek Jakowski, Bobby G Sumpter, Iliia N Ivanov, Ying-Zhong Ma, Christopher M Rouleau, Sean C Smith, David B Geohegan, Kunlun Hong, Kai Xiao. *Nature Communications* 5, 3180 (2014).
77. "Studies on Supercapacitor Electrode Material from Activated Lignin-Derived Mesoporous Carbon". Dipendu Saha, Yunchao Li, Zhonghe Bi, Jihua Chen, Jong K Keum, Dale Hensley, Hippolyte A Grappe, Harry M Meyer, Sheng Dai, Mariappan Parans Paranthaman, Amit K Naskar. *Langmuir* 30, 900 (2014).
78. "In situ determination of the liquid/solid interface thickness and composition for the Li-ion cathode $\text{LiMn}_{1.5}\text{Ni}_{0.5}\text{O}_4$ ". James F. Browning, Loïc Baggetto, Katherine Jungjohann, Yongqiang Wang, Wyatt Tenhaeff, Jong K Keum, David Lee Wood, III, Gabriel M Veith. *ACS Applied Materials & Interfaces* 6, 18569 (2014).
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