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**Professor**

**Department of Materials Science and Engineering  
Graduate School of Semiconductor Materials and Devices  
Engineering**

**Ulsan National Institute of Science and Technology  
( UNIST )**

**Member, Young Korean Academy Science & Technology (Y-  
KAST)**

**Date of birth** 1979.08.28  
**Nationality** Republic of Korea  
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## **EDUCATION**

2005.3-2011.2 **M.S & Ph.D. (Joint degree)**  
**Interdisciplinary of Nanoscience and Technology,**  
**Seoul National University**  
*Thesis Title:* Synthesis and Characterization of Cadmium Selenide Nanosheets  
and Bismuth Nanocrystals  
*Thesis Advisor:* Prof. Taeghwan Hyeon

1998.3-2005.2 **B.S. Applied Chemistry,**  
**Seoul National University, cum laude**  
(Military Service in Korean Army: 2000~2002)

## **RESEARCH AND PROFESSIONAL EXPERIENCE**

2022.9-present **Professor**  
Department of Materials Science and Engineering, UNIST

2019.9-2022.8 **UNIST's Rising-Star Distinguished Professor**

2014.2-2022.8 **Assistant Professor & Associate Professor**  
School of Materials Science and Engineering, UNIST

2012.4-2014.1 **Postdoctoral Researcher**  
Department of Chemistry, University of Chicago  
(*Advisor:* Prof. Dmitri V. Talapin)

2011.3-2012.3 **Postdoctoral Researcher**  
School of Chemical and Biological Engineering, Seoul National University  
(*Advisor:* Prof. Taeghwan Hyeon)

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**RECENT AWARDS AND HONORS**


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2021	<b>Member, Young Korean Academy of Science and Technology (Y-KAST) (2022-2024)</b>
2020	<b>Samsung Humantech Bronz medal (Soyoung Cho)</b>
2019	<b>Fellowship, LG Yeonam Foundation</b>
2019	<b>UNIST's Rising-Star Distinguished Professor</b>
2019	<b>UNIST's Outstanding Faculty Award</b>
2016	<b>Best Poster Award</b> at the 3 <sup>rd</sup> International Conference & Exhibition for Nanotechnology (NANOPIA 2016)
2014	<b>Best Presentation Award</b> , at the 2014 Conference for the Korean Institute of Electrical and Electronic Material Engineering
2010	<b>Best Poster Awards</b> at the IEEE NANO 2010, 10th IEEE International Conference on Nanotechnology Joint Symposium with NANOKOREA 2010
2005~	Peer reviewer for <i>Nature Electronics, Communications, J. Am. Chem. Soc., Adv. Mater., Adv. Energy Mater., Adv. Func. Mater. J. Phys. Chem. Lett., Chem. Mater., Small, Nano Energy, ACS Appl. Mater. Interfaces, etc.</i>

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**PROFESSIONAL SERVICES**


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2020	<b>Session Organizer</b> at The 6th International Conference on Advanced Electromaterials(ICAIE 2021)
2019	<b>Scientific Program Committee</b> at The 38 <sup>th</sup> International Conference on Thermoelectrics and The 4 <sup>th</sup> Asian Conference on Thermoelectrics (ICT/ACT 2019)
2019	<b>Session Organizer</b> at Materials Challenges in Alternative and Renewable Energy 2019 (MCARE 2019)
2017	<b>Conference Committee</b> at 2017 Fall The Korean Ceramic Society (2017)
2016	<b>Conference Committee</b> at The International Conference & Exhibition for Nanotechnology 2016 (NANOPIA 2016)
2015	<b>Conference Committee</b> at The International Conference & Exhibition for Nanotechnology 2015 (NANOPIA 2015)
2014~	Member of The Korean Institute of Electrical and Electronic Material Engineer Member of The Korean Ceramic Society Member of The Korean Institute of Chemical Engineers

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**RESEARCH SUPERVISION**


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MS/PhD Integrated students	2016~	Da Hwi Gu, Seung Hwae Heo, Seungjun Choo
	2017~	Seongheon Baek, Wooyong Choi, Minju Song
	2018~	Jungsoo Lee, Seong Eun Yang
	2019~	Yoonkyum Kim
	2021~	Jungmin Cho, Gunguk Kim, Yae Eun Park
	2022~	Hyunjin Han, Hye In Hwang
Alumni	2015~2017	Sung Hoon Park (TESBI, Inc.)
	2016~2018	Sang Min Park (LG Chem, Inc.)
	2016~2018	Hyewon Jeong (University of Illinois Urbana-Champaign)

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2015~2020 Seungki Jo (Korean Institute of Materials Science (KIMS))  
2019~2021 Soyoung Cho (Samsung Electronics)  
2015~2022 Hyeong Woo Ban (University of Toronto)  
2016~2022 Fredrick Kim (Argon National Laboratory)

### **COURSES TAUGHT (in English)**

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2014-present **Introduction to Nanomaterials** (for undergraduate)  
2014-present **Introduction to NanoEnergy Materials** (for undergraduate)  
2016-2017 **Nanomaterials Laboratory** (for undergraduate)  
2016 **Introduction to Semiconductors** (for undergraduate)  
2014-present **Nano Convergent Energy Devices** (for graduate)  
2014 **Linear Algebra** (for undergraduate)

### **PUBLICATIONS**

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- [61] Sun-Woo Kim, Jin-Kyeom Kim, Ji Young Park, Jinhong Mun, Sungwoo Jung, Seong Eun Yang, Geunsik Lee, Pooi See Lee, Hyun-Cheol Song, Changduk Yang, Hyesung Park\*, **Jae Sung Son\***, & Jeong Min Baik\* "Boosted Output Voltage of BiSbTe-based Thermoelectric Generators via Coupled Effect between Thermoelectric Carriers and Triboelectric Charges" *Adv. Energy Mater.* [early view](#).
- [60] Seung Hwaee Heo, Hosun Shin\*, and **Jae Sung Son\*** "Recent advances in solution-processed inorganic thermoelectric thin films" *ChemNanoMat* [early view](#).
- [59] Da Hwi Gu, Woo Yong Choi, and **Jae Sung Son\*** "Self-assembly of matchstick-shaped inorganic nano-surfactants with controlled surface amphiphilicity " *JACS Au* **2022**, *2*, 2307-2315. (Selected as a Supplementary Cover Art.)
- [58] Seongheon Baek†, Hyeong Woo Ban†, Sanggyun Jung†, Seung Hwaee Heo, Da Hwi Gu, Wooyong Choi, Seungjun Choo, Yae Eun Park, Jisu Yoo, Moon Kee Choi, Jiseok Lee\*, and **Jae Sung Son\*** "Generalised optical printing of photocurable metal chalcogenides" *Nature Commun.* **2022**, *13*, 5262.
- [57] Seung Hwaee Heo, Jisu Yoo, Hyejeong Lee, Hanhwi Jang, Seungki Jo, Jeongmin Cho, Seongheon Baek, Seong Eun Yang, Hyun Jung Mun, Min-Wook Oh, Hosun Shin\*, Moon Kee Choi\*, Tae Joo Shin\*, and **Jae Sung Son\*** "Solution-Processed Hole-Doped SnSe Thermoelectric Thin-Film Devices for Low-Temperature Power Generation" *ACS Energy Letters* **2022**, *7*, 2092-2101.
- [56] Albert Tarancón\*, Vincenzo Esposito\*, Marc Torrell, Marcel Di Vece, **Jae Sung Son**, Poul Norby , Sourav Barg, Patrik S. Grant, A. Vogelpoth, S. Linnenbrink, M. Brucki, T. Schopphoven, A. Gasser, Elif Persembe, Dionysia Koufou, Simon Kuhn, Rob Ameloot, Xu Hou, Kurt Engelbrecht, Christian R. H. Bahl, Nini Pryds, Jie Wang, Costas Tsouris, Eduardo Miramontes, Lonnie Love, Canhai Lai, Xin Sun, Martin Ryhl Kærn, Gennaro Criscuolo, David Bue Pedersen "2022 Roadmap on 3D Printing for Energy" *J. Phys. Energy* **2022**, *4*, 011501. (Invited Review Article)

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- [55] Seung Hwaee Heo, Seongheon Baek, Tae Joo Shin\*, and **Jae Sung Son\*** "Fabrication of high-performance SnSe<sub>2</sub> thermoelectric thin films with preferred crystallographic orientation" *Appl. Phys. Lett.* **2022**, *120*, 023901.
- [54] Seungmin Baek,‡ Soyoung Cho,‡ Hyo-Geun Kwon, Seung Hwaee Heo, **Jae Sung Son,\*** and Sang-Wook Kim\* "Cation-Exchange Synthesis of Lead Bismuth Sulfide Quantum Dots and Nanorods for Thermoelectric Applications" *Chem. Mater.* **2021**, *33*, 6804–6812.
- [53] Fredrick Kim†, Seong Eun Yang†, Hyejin Ju†, Seungjun Choo, Jungsoo Lee, Gyeonghun Kim, Soo-ho Jung, Suntae Kim, Chaenyung Cha, Kyung Tae Kim, Sangjoon Ahn, Han Gi Chae\*, and **Jae Sung Son\*** "Direct ink writing of 3D thermoelectric architectures for fabrication of micro power generators" *Nature Electronics* **2021**, *4*, 579-587. (Featured as "**the August Cover**") (Highlighted in Research Highlights in Nature "An ink 'writes' tiny generators that are powered by heat")
- [52] Seungjun Choo†, Faizan Ejaz†, Hyejin Ju, Fredrick Kim, Jungsoo Lee, Seong Eun Yang, Gyeonghun Kim, Hangeul Kim, Seungki Jo, Seongheon Baek, Soyoung Cho, Ju-Young Kim, Sangjoon Ahn, Han Gi Chae\*, Beomjin Kwon\*, and **Jae Sung Son\*** "Cu<sub>2</sub>Se-based Thermoelectric Cellular Architectures for Efficient and Durable Power Generation" *Nature Commun.* **2021**, *12*, 3550.
- [51] Seung Hwaee Heo, Seungki Jo, Soyoung Cho and **Jae Sung Son\*** "Thin Film and Flexible Thermoelectric Generators, Devices and Sensors" Springer, 2021, Part I-3. Solution-Processed Metal Chalcogenide Thermoelectric Thin Films.
- [50] Fredrick Kim, Seungjun Choo and **Jae Sung Son\*** "3D Printing for Energy Applications" WILEY, 2021, C.6 THERMOELECTRICS.
- [49] Jungsoo Lee, Seungjun Choo, Hyejin Ju, Jaehyung Hong, Seong Eun Yang, Fredrick Kim, Da Hwi Gu, Jeongin Jang, Ji Eun Lee, Sung Youb Kim\*, Han Gi Chae\*, and **Jae Sung Son\*** "Doping-Induced Viscoelasticity in PbTe Thermoelectric Inks for 3D Printing of Power-Generating Tubes" *Adv. Energy Mater.* **2021**, *11*, 2100190. (Selected as a "**Front Cover**")
- [48] Seungki Jo†, Soyoung Cho†, U Jeong Yang†, Gyeong-Seok Hwang, Si-Hoon Kim, Seung Hwaee Heo, Ju-Young Kim\*, Moon Kee Choi\* and **Jae Sung Son\*** "Solution-processed stretchable Ag<sub>2</sub>S semiconductor thin films for wearable self-powered nonvolatile memory" *Adv. Mater.* **2021**, *33*, 2100066. (Selected as a "**Inside Back Cover**")
- [47] Sun-Woo Kim, U Jeong Yang, Jae Won Lee, Fredrick Kim, Yongchul Kim, Geunsik Lee, **Jae Sung Son\***, and Jeong Min Baik\* "Triboelectric charge-driven Enhancement of the Output Voltage of BiSbTe-based Thermoelectric Generators" *ACS Energy Lett.* **2021**, *6*, 1095-1103.
- [46] Shi-Hyun Seok, Seungjun Choo, Jinsung Kwak, Hye-Jin Ju, Ju-Hyung Han, Woo-Seok Kang, Joonsik Lee, Se-Yang Kim, Do Hee Lee, Jungsoo Lee, Jaewon Wang, Seunguk Song, Wook Jo, Byung Mun Jung, Han Gi Chae\*, **Jae Sung Son\***, and Soon-Yong Kwon\* "Synthesis of Solution-Processed 2D Carbide MXene Flakes Using Highly Purified Precursors for Ink Applications" *Nanoscale Adv.* **2021**, *3*, 517-527.

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- [45] Seong Eun Yang, Fredrick Kim, Faizan Ejaz, Gi Seung Lee, Hyejin Ju, Seungjun Choo, Jungsoo Lee, Gyeonghun Kim, Soo-ho Jung, Sangjoon Ahn, Han Gi Chae\*, Kyung Tae Kim\*, Beomjin Kwon\*, **Jae Sung Son\*** "Composition-segmented BiSbTe thermoelectric generator fabricated by multimaterial 3D printing" *Nano Energy* **2021**, *81*, 105683.
- [44] Du San Baek, Kyung Ah lee, Jaehyuk Park, Jae Hyung Kim, Jungsoo Lee, June Sung Lim, So Young Lee, Tae Joo Shin, Hu Young Jeong, **Jae Sung Son**, Seok Ju Kang\*, Jin Young Kim\*, Sang Hoon Joo\* "Ordered Mesoporous Carbons with Graphitic Tubular Frameworks by Dual Templating for Efficient Electrocatalysis and Energy Storage" *Angew. Chem. Int. Ed.* **2020**, *59*, 2-11.
- [43] Da Hwi Gu, Jungsoo Lee, Hyeong Woo Ban, Gibok Lee, Minju Song, Wooyong Choi, Seongheon Baek, Hyewon Jeong, Song Yeul Lee, Yong Il Park\*, and **Jae Sung Son\*** "Thiometalate precursors for the synthesis of supported Pt and PtNi nanoparticle electrocatalysts: Size-focusing by S capping" *Chem. Mater.* **2020**, *32*, 8662-8671.
- [42] Wooyong Choi,+ Jong Min Kim,+ Chang-Kyu Hwang,+ Myeonggi Choe, Seongheon Baek, Hyeong Woo Ban, Da Hwi Gu, Hyewon Jeong, Zonghoon Lee, Jin Young Kim,\* and **Jae Sung Son\*** "Thiometalate precursors for the synthesis of supported Pt and PtNi nanoparticle electrocatalysts: Size-focusing by S capping" *Nanoscale* **2020**, *12*, 10498-10504.
- [41] Bora Seo, Gwan Yeong Jung, Se Jeong Lee, Du San Baek, Young Jin Sa, Hyeong Woo Ban, **Jae Sung Son**, Kiyoun Park,\* Sang Kyu Kwak,\* and Sang Hoon Joo\* "Monomeric MoS<sub>4</sub><sup>2-</sup>-Derived Polymeric Chains with Active Molecular Units for Efficient Hydrogen Evolution Reaction" *ACS Catal.* **2020**, *10*, 652-662.
- [40] Hyeong Woo Ban†, Jong Gyu Oh†, Seungki Jo, Hyewon Jeong, Da Hwi Gu, Seongheon Baek, Song Yeul Lee, Yong Il Park, Jaeyoung Jang\*, and **Jae Sung Son\*** "Polyphosphide Precursor for Low-Temperature Solution-Processed Fibrous Phosphorus Thin Films" *Chem. Mater.* **2019**, *31*, 5909-5918.
- [39] Seungki Jo, Sun Hwa Park, Hosun Shin, Inseon Oh, Seung Hwa Heo, Hyeong Woo Ban, Hyewon Jeong, Fredrick Kim, Seungjun Choo, Da Hwi Gu, Soyoung Cho, Ji Eun Lee, Jung-Woo Yoo, Jae Yong Song and **Jae Sung Son\*** "Soluble Telluride-Based Molecular Precursor for Solution-Processed High-Performance Thermoelectrics" *ACS Appl. Energy Mater.* **2019**, *2*, 4582-4589.
- [38] Seongheon Baek, Jinu Kim, Han Kim, Sangmin Park, Hyeong Woo Ban, Da Hwi Gu, Hyewon Jeong, Fredrick Kim, Yong-Ho Choa,\* Ki Hyeon Kim,\* and **Jae Sung Son\*** "Controlled assembly of colloidal nanoparticles on graphene through tailored electrostatic interaction" *ACS Appl. Mater. Interfaces* **2019**, *11*, 11824-11833.
- [37] Youngho Eom, Fredrick Kim, **Jae Sung Son\***, and Han Gi Chae\* "Rheological design of 3D printable all-inorganic inks using BiSbTe-based thermoelectric materials" *J. Rheol.* **2019**, *63*, 291-304. (Selected as a "Front Cover")

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- [36] Seung Hwaee Heo<sup>†</sup>, Seungki Jo<sup>†</sup>, Jae Yong Song, Jun-Yun Kang, No-Jin Park, Hyeong Woo Ban, Fredrick Kim, Hyewon Jeong, Hosun Shin\* and **Jae Sung Son\*** "Composition change-driven texturing and doping in solution-processed SnSe thermoelectric thin films" *Nature Commun.* **2019**, *10*, 864.
- [35] Seungjun Choo,<sup>‡</sup> Hyeong Woo Ban,<sup>‡</sup> Da Hwi Gu, Hyewon Jeong, Seungki Jo, Wook Jo, and **Jae Sung Son\*** "Synthesis of inorganic-organic two-dimensional CdSe slab-diamine quantum nets" *Small* **2019**, *15*, 1804426.
- [34] Seungki Jo, Seungjun Choo, Fredrick Kim, Seung Hwaee Heo, and **Jae Sung Son\*** "Ink processing for thermoelectric materials and power generating devices" *Adv. Mater.* **2019**, *31*, 1804930. (Selected as a "Frontispiece")
- [33] Hyewon Jeong and **Jae Sung Son\*** "Technology Trend of Luminescent Nanomaterials" *J. Korean Powder Metall. Inst.* **2018**, *25*, 170-177.
- [32] Fredrick Kim,<sup>+</sup> Beomjin Kwon,<sup>+</sup> Youngho Eom, Ji Eun Lee, Sangmin Park, Seungki Jo, Sung Hoon Park, Bong-Seo Kim, Hye Jin Im, Min Ho Lee, Tae Sik Min, Kyung Tae Kim, Han Gi Chae, William King, and **Jae Sung Son\*** "3D printing of shape-conformable thermoelectric materials using all-inorganic Bi<sub>2</sub>Te<sub>3</sub>-based inks" *Nature Energy* **2018**, *3*, 301-309. (Highlighted in "Next Step in Manufacturing" News & Views in Nature Energy 2018, 3, 259-260)
- [31] Hyewon Jeong, Sinmyung Yoon, Jung Hwa Kim, Do-Hyun Kwak, Seung Hwaee Heo, Da Hwi Gu, Hyunhong Kim, Sangmin Park, Hyeong Woo Ban, Jongnam Park, Zonghoon Lee, Jong-Soo Lee, Kwangjin An\* and **Jae Sung Son\*** "Transition Metal-Based Thiometallates as Surface Ligands for Functionalization of All-Inorganic Nanocrystals" *Chem. Mater.* **2017**, *29*, 10510-10517.
- [30] Yeon Soo Jung, Dea Han Jeong, Sung Bum Kang, Fredrick Kim, Myeong Hoon Jeong, Ki-Suk Lee, **Jae Sung Son**, Jeong Min Baik, Jin-Sang Kim, and Kyoung Jin Choi\* "Wearable solar thermoelectric generator driven by unprecedentedly high temperature difference" *Nano Energy* **2017**, *40*, 663-627.
- [29] Junhyeon Jo, Inseon Oh, Mi-Jin Jin, Jungmin Park, **Jae Sung Son**, Ki-Seok An, and Jung-Woo Yoo "Highly stretchable organic thermoelectrics with an enhanced power factor due to extended localization length" *Org. Electron.* **2017**, *50*, 367-375.
- [28] Hao Zhang, **Jae Sung Son**, Dmitriy S. Dolzhenkov, Alexander S. Filatov, Abhijit Hazarika, Yuan Yuan Wang, Margaret H. Hudson, Cheng-Jun Sun, Soma Chattopadhyay, and Dmitri V. Talapin "Soluble Lead and Bismuth Chalcogenidometallates: Versatile Solders for Thermoelectric Materials" *Chem. Mater.* **2017**, *29*, 6369-6404.
- [27] Da Hwi Gu, Seungki Jo, Hyewon Jeong, Hyeong Woo Ban, Sung Hoon Park, Seung Hwaee Heo, Fredrick Kim, Jeong In Jang, Ji Eun Lee,\* and **Jae Sung Son\*** "Colloidal Synthesis of Te-doped Bi Nanoparticles: Low-Temperature Charge Transport and Thermoelectric Properties" *ACS Appl. Mater. Interfaces* **2017**, *9*, 19143-19151.

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- [26] Eunbyul Bang, Yonghoon Choi, Jinhee Cho, Yo-Han Suh, Hyeong Woo Ban, **Jae Sung Son\***, and Jongnam Park\* "Large-Scale Synthesis of Highly Luminescent InP@ZnS Quantum Dots Using Elemental Phosphorus Precursor" *Chem. Mater.* **2017**, *29*, 4236-4243.
- [25] Hyeong Woo Ban,<sup>†</sup> Sangmin Park,<sup>†</sup> Hyewon Jeong, Da Hwi Gu, Seungki Jo, Sung Hoon Park, Jongnam Park, **Jae Sung Son\*** "Molybdenum and tungsten sulfide ligands for versatile functionalization of all-inorganic nanocrystals" *J. Phys. Chem. Lett.* **2016**, *7*, 3627-3635.
- [24] Sung Hoon Park, Seungki Jo, Hyeong Woo Ban, Ji Eun Lee, Da Hwi Gu, Fredrick Kim, Younghun Hwang, Jin-Sang Kim, Dow-Bin Hyun, Sukbin Lee, Kyoung Jin Choi, Wook Jo, **Jae Sung Son\*** "High performance shape-engineerable thermoelectric painting" *Nature Comm.* **2016**, *7*, 13403.
- [23] Seungki Jo, Sunghoon Park, Hyeong Woo Ban, Da Whi Gu, Bong-Seo Kim, Hyo-Ki Hong, Zonghoon Lee, Hyoung-Su Han, Wook Jo, Ji Eun Lee\*, **Jae Sung Son\*** "Simultaneous Improvement in Electrical and Thermal Properties of Interface-engineered BiSbTe Nanostructured Thermoelectric Materials" *J. Alloy. Compd.* **2016**, *689*, 899-907.
- [22] Chang-Hyo Hong, Hwang-Pill Kim, Byung-Yul Choi, Hyoung-Su Han, **Jae Sung Son**, Chang Won Ahn, Wook Jo "Lead-Free Piezoceramics-Where to Move on?" *J. of Materiomics.* **2016**, *2*, 1-24.
- [21] Jiwoong Yang, Rachel Fainblat, In Young Kim, Inchul Park, Jung Ho Yu, Hendrik Terlinden, Byung Hyo Kim, Dino Iavarone, Moon Kee Choi, Hyo-Ki Hong, **Jae Sung Son**, Zonghoon Lee, Kisuk Kang, Seong-Ju Hwang, Gerd Bacher, Taeghwan Hyeon "Mn<sup>2+</sup>-doped (CdSe)<sub>13</sub> Clusters: The Smallest Doped Semiconductor" *J. Am. Chem. Soc.* **2015**, *137*, 12776-12779.
- [20] Junhyeong Kim, Eunjung Kang, **Jae Sung Son**, In Woo Cheong, Jin Joo "Near- Room Temperature Synthesis of Core/Shell-Structured Quantum Dots" *J. Nanosci. Nanotechnol.* **2015**, *15*, 7146-7152.
- [19] Dmitriy S. Dolzhanov, Hao Zhang, Jaeyoung Jang, **Jae Sung Son**, Matthew G. Panthani, Tomohiro Shibata, Soma Chattopadhyay, Dmitri V. Talapin "Composition-matched molecular "solders" for semiconductors" *Science* **2015**, *347*, 425-428.
- [18] Kwangjin An, Hyon Bin Na, Yong Il Park, Seung Hong Choi, **Jae Sung Son**, Nohyun Lee "Bifunctional hollow Pt/MnOxPy yolk/shell nanoparticles as a T1 MRI contrast and anticancer agent" *J. Colloid Interface Sci.* **2015**, *439*, 134-138.
- [17] **Jae Sung Son**, Hao Zhang, Jaeyoung Jang, Bed Poudel, Al Waring, Luke Nally, Dmitri V. Talapin "All-inorganic nanocrystals as a glue for BiSbTe grains: design of interfaces in mesostructured thermoelectric materials" *Angew. Chem. Int. Ed.*, **2014**, *53*, 7466-7470.
- [16] Kunsu Park, **Jae Sung Son**, Sung Ill Woo, Kwangsoo Shin, Min-Wook Oh, Su-Dong Park, Taeghwan Hyeon "Colloidal Synthesis and Thermoelectric Properties of La-doped SrTiO<sub>3</sub> Nanoparticles" *J. Mater. Chem.* **2014**, *2*, 4217-4224.

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- [15] Jaeyoung Jang, Wenyong Liu, **Jae Sung Son**, Dmitri V. Talapin “*Temperature-Dependent Hall and Field-effect Mobility in Strongly Coupled All-Inorganic Nanocrystal Arrays*” *Nano Lett.* **2014**, *14*, 653-662.
- [14] Hao Zhang, **Jae Sung Son**, Jong-Soo Lee, Jaeyoung Jang, Wee-Liat Ong, Jonathan A. Malen, Dmitri V. Talapin “*Bi<sub>1-x</sub>Sb<sub>x</sub> Alloy Nanocrystals: Colloidal Synthesis, Charge Transport and Thermoelectric Properties*” *ACS Nano* **2013**, *7*, 1918-1923.
- [13] **Jae Sung Son**,<sup>+</sup> Jong-Soo Lee,<sup>+</sup> Elena V. Shevchenko, Dmitri V. Talapin “*Magnet-in-the-Semiconductor Nanomaterials: High Electron Mobility in All-Inorganic Arrays of FePt/CdSe and FePt/CdS Core-Shell Heterostructures*” *J. Phys. Chem. Lett.* **2013**, *4*, 1918-1923.
- [12] Jiwoong Yang, **Jae Sung Son**, Jung Ho Yu, Jin Joo, Taeghwan Hyeon “*Advances in the Colloidal Synthesis of Two-Dimensional Semiconductor Nanoribbons*” *Chem. Mater.* (Invited Review Article) **2013**, *25*, 1190-1198.
- [11] **Jae Sung Son**, Soon Gu Kwon, Jung Ho Yu, Kunsu Park, Moon Kee Choi, Junhyeong Kim, Jin Joo, Taeghwan Hyeon “*Dimension-Controlled Synthesis of CdS Nanocrystals: From 0-D Nanospheres to 2-D Nanoplates*” *Small*, **2012**, *8*, 2394-2402.
- [10] **Jae Sung Son**, Moon Kee Choi, Mi-Kyung Han, Kunsu Park, Jae-Yeol Kim, Chan Park, Sung-Jin Kim, Taeghwan Hyeon “*n-type Nanostructured Thermoelectric Materials Prepared from Chemically Synthesized Ultrathin Bi<sub>2</sub>Te<sub>3</sub> Nanoplates*” *Nano Lett.* **2012**, *12*, 640-647.
- [9] **Jae Sung Son**, Jung Ho Yu, Soon Gu Kwon, Jihwa Lee, Jin Joo, Taeghwan Hyeon “*Colloidal Synthesis of Ultrathin Two-Dimensional Semiconductor Nanocrystals*” *Adv. Mater.*, **2011**, *23*, 3214-3219.
- [8] Mihyun Park, Nohyun Lee, Seung Hong Choi, Kwangjin An, Seung-Ho Yu, Jeong Hyun Kim, Seung-Hae Kwon, Dokyoon Kim, Hyoungsu Kim, Sung-Il Baek, Tae-Young Ahn, Ok Kyu Park, **Jae Sung Son**, Yung-Eun Sung, Young-Woon Kim, Zhongwu Wang, Nicola Pinna, Taeghwan Hyeon  
“*Large-Scale Synthesis of Ultrathin Manganese Oxide Nanoplates and Their Applications to T1 MRI Contrast Agents*” *Chem. Mater.* **2011**, *23*, 3318-3324.
- [7] **Jae Sung Son**, Kunsu Park, Mi-Kyung Han, Chanyoung Kang, Sung-Geun Park, Jae-Hee Kim, Prof. Woochul Kim, Sung-Jin Kim, Taeghwan Hyeon “*Large-Scale Synthesis and Characterization of the Size-Dependent Thermoelectric Properties of Uniformly Sized Bismuth Nanocrystals*” *Angew. Chem. Int. Ed.* **2011**, *50*, 1363-1366.
- [6] Zhongwu Wang, Xiao-Dong Wen, Roald Hoffmann, **Jae Sung Son**, Ruipeng Li, Chia-Chen Fang, Detlef-M. Smilgies, Taeghwan Hyeon “*Reconstructing a solid-solid phase transformation pathway in CdSe nanosheets with associated soft ligands*” *Proc. Natl. Acad. Sci. U.S.A.* **2010**, *107*, 17119-17124.
- [5] Jung Ho Yu, Xinyu Liu, Kyoung Eun Kweon, Jin Joo, Jiwon Park, Kyung-Tae Ko, Dong Won Lee, Shaoping Shen, Kritsanu Tivakornsasithorn, **Jae Sung Son**, Jae-Hoon Park, Young-Woon



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- Kim, Gyeong S. Hwang, Margaret Dobrowolska, Jacek K. Furdyna, Taeghwan Hyeon “*Giant Zeeman Splitting in Nucleation-Controlled Doped CdSe:Mn<sup>2+</sup> Quantum Nanoribbons*” *Nat. Mater.* **2010**, *9*, 47-53.
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- [3] Kwangjin An, Soon Gu Kwon, Mihyun Park, Hyon Bin Na, Sung-Il Baik, Jung Ho Yu, Dokyoon Kim, **Jae Sung Son**, Young Woon Kim, In Chan Song, Woo Kyung Moon, Hyun Min Park, and Taeghwan Hyeon. “*Synthesis of Uniform hollow oxide nanoparticles through nanoscale acid etching*” *Nano Lett.* **2008**, *8*, 4252-4258.
- [2] Sang-Hyun Choi, Hyon Bin Na, Yong Il Park, Kwangjin An, Soon Gu Kwon, Youngjin Jang, Mi-hyun Park, Jaewon Moon, **Jae Sung Son**, In Chan Song, Woo Kyung Moon, Taeghwan Hyeon “*Simple and Generalized Synthesis of Oxide-Metal Heterostructured Nanoparticles and their Applications in Multimodal Biomedical Probes*” *J. Am. Chem. Soc.* **2008**, *130*, 15573-15580.
- [1] Jin Joo, **Jae Sung Son**, Soon Gu Kwon, Jung Ho Yu , Taeghwan Hyeon, “*Low-Temperature Solution-Phase Synthesis of Quantum Well Structured CdSe Nanoribbons*” *J. Am. Chem. Soc.* **2006**, *128*, 5632-5633.  
Highlighted in "Nanoribbon glow," Chemical & Engineering News (Science Concentrate), 2006 (May 1), vol. 84, p. 28.

### Patents (selected)

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**Granted patents: 2 (U.S.) / 3 (PCT) / 16 (Republic of Korea)**

**Applied patents: 9 (Republic of Korea)**

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|---------|---|
| Granted | 2018.01.08. <b>Jae Sung Son</b> , Sung Hoon Park “PAINTS FOR THERMOELECTRIC MATTER OF Bi <sub>2</sub> Te <sub>3</sub> SERIES, THERMOELECTRIC MATTER AND METHOD THEREOF” 10-1818343, Republic of Korea.                                  |
|         | 2019.05.17. <b>Jae Sung Son</b> , Fredrick Kim “INK FOR 3D PRINTING THERMOELECTRIC MATERIAL, THERMOELECTRIC DEVICE COMPRISING 3D PRINTING THERMOELECTRIC MATERIAL, AND MANUFACTURING METHOD OF THE SAME” 10-1981855, Republic of Korea. |
| Applied | 2017.12.13. <b>Jae Sung Son</b> , Fredrick Kim, “THERMOELECTRIC (TE) INK FOR THREE-DIMENSIONAL (3D) PRINTED TE MATERIALS, TE MODULE INCLUDING 3D PRINTED TE MATERIAL, AND METHOD OF MANUFACTURING TE MODULE” 15/840667, U.S.            |

## Jae Sung Son, Ph.D.

10

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and 24 others.

### Recent Presentation (selected)

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- Dec. 2022 **Jae Sung Son** “*Direct ink writing of thermoelectric materials and devices*” 2022 MRS Fall meeting, Boston, U.S. [**Invited talk**]
- Sep. 2022 **Jae Sung Son** “*3D printing of inorganic thermoelectric materials and devices*” European Conference of Thermoelectrics 2022 (ECT ‘22), Barcelona, Spain [**Invited talk**]
- Dec. 2021 **Jae Sung Son**, Fredrick Kim, Seungjun Choo, Jungsoo Lee, Seoung Eun Yang, “*3D printing of inorganic thermoelectric materials*” 2021 MRS Fall meeting, Boston, U.S. [**Invited talk**]
- Mar. 2021 **Jae Sung Son** “*Advances in Additive Manufacturing for Heat Transfer Applications*” International Colloquia on Thermal Innovations (MIT Department of Mechanical Engineering Webinar) [**Invited talk**]
- Jul. 2019 **Jae Sung Son**, Seungki Jo, Fredrick Kim, and Seungjun Choo, “*Ink processing for thermoelectric materials and devices*” The 28th International Conference on Thermoelectrics and The 4<sup>th</sup> Asian Conference on Thermoelectrics (ICT/ACT 2019), Gyeongju, Korea [**Invited talk**]
- Aug. 2018 **Jae Sung Son**, Seungki Jo, Fredrick Kim, and Seungjun Choo, “*High-performance Thermoelectric Inks for Power Generation Application*” The 5th International Conference on Electronic Materials and Nanotechnology for Green Environment (ENGE 2018), Jeju, Korea [**Invited talk**]
- Aug. 2018 **Jae Sung Son**, Seungki Jo, Fredrick Kim, and Seungjun Choo, “*High Performance Shape Engineerable Thermoelectric Pastes*” International Union of Materials Research Societies; International Conference on Electronic Materials 2018 (IUMRS-ICEM 2018), Daejeon, Korea [**Invited talk**]
- May 2017 **Jae Sung Son**, Seungki Jo, Fredrick Kim, and Seungjun Choo, “*Expanding the versatility of thermoelectric materials by the introduction of molecular-solders*” 12th Pacific Rim Conference on Ceramic and Glass Technology, Hawaii, USA [**Invited talk**]