

# Stanford

---

## Hyun Soo (Eric) Han

Physical Science Research Scientist

Mechanical Engineering

### Bio

---

#### ACADEMIC APPOINTMENTS

- Phys Sci Res Assoc, Mechanical Engineering

### Publications

---

#### PUBLICATIONS

- **Dual textured BiVO<sub>4</sub>/Sb:SnO<sub>2</sub> heterostructure for enhanced photoelectrochemical Water-splitting** *CHEMICAL ENGINEERING JOURNAL*  
Jeong, Y., Hwang, S., Chaikasetsin, S., Han, H., Cho, I.  
2022; 435
- **Improving intrinsic oxygen reduction activity and stability: Atomic layer deposition preparation of platinum-titanium alloy catalysts** *APPLIED CATALYSIS B-ENVIRONMENTAL*  
Kim, Y., Xu, S., Park, J., Dadlani, A., Vinogradova, O., Krishnamurthy, D., Orazov, M., Lee, D., Dull, S., Schindler, P., Han, H., Wang, Z., Graf, et al  
2022; 300
- **Enhancing Solar Water Splitting of Textured BiVO<sub>4</sub> by Dual Effect of a Plasmonic Silver Nanoshell: Plasmon-Induced Light Absorption and Enhanced Hole Transport** *ACS APPLIED ENERGY MATERIALS*  
Caliskan, S., Kim, J., Han, G., Qin, F., Cho, I., Han, H., Lee, J.  
2020; 3 (12): 11886–92
- **Condensing water vapor to droplets generates hydrogen peroxide.** *Proceedings of the National Academy of Sciences of the United States of America*  
Lee, J. K., Han, H. S., Chaikasetsin, S., Marron, D. P., Waymouth, R. M., Prinz, F. B., Zare, R. N.  
2020
- **Boosting the solar water oxidation performance of a BiVO<sub>4</sub> photoanode by crystallographic orientation control** *ENERGY & ENVIRONMENTAL SCIENCE*  
Han, H., Shin, S., Kim, D., Park, I., Kim, J., Huang, P., Lee, J., Cho, I., Zheng, X.  
2018; 11 (5): 1299–1306
- **Activating and optimizing MoS<sub>2</sub> basal planes for hydrogen evolution through the formation of strained sulphur vacancies (vol 15, pg 48, 2016)** *NATURE MATERIALS*  
Li, H., Tsai, C., Koh, A. L., Cai, L., Contryman, A. W., Fragapane, A. H., Zhao, J., Han, H. S., Manoharan, H. C., Abild-Pedersen, F., Nørskov, J. K., Zheng, X.  
2016; 15 (3)
- **Bimetallic NiO/NiFe<sub>2</sub>O<sub>4</sub> heterostructures with interfacial effects for boosting electrochemical water splitting applications** *JOURNAL OF ELECTROANALYTICAL CHEMISTRY*  
Jesudass, S., Surendran, S., Kim, J., Shanmugapriya, S., Moon, D., Janani, G., Veeramani, K., Mahadik, S., Choi, J., Jung, P., Kim, I., Park, H., Han, et al  
2024; 952
- **Ultralow-Overpotential Acidic Oxygen Evolution Reaction Over Bismuth Telluride-Carbon Nanotube Heterostructure with Organic Framework.** *Small (Weinheim an der Bergstrasse, Germany)*  
Arbab, A. A., Cho, S., Jung, E., Han, H. S., Park, S., Lee, H.  
2023; e2307059
- **<span contenteditable="false" data-cke-magic-line="1" style="width: 636px; height: 0px; padding: 0px; margin: 0px; display: block; z-index: 9999; color: rgb(255,255,255); font-size: 0px; line-height: 0px; position: absolute; border-top: 1px dashed rgb(255,0,0); user-select: none; left:-1.48148px; top:**

- 65.213px;"><span style="color:#fffff">& nbsp;</span><span style="color:#fffff">& nbsp;</span><span style="color:#fffff">?</span></span></span>In situ decorated Cu<sub>2</sub>FeSnS<sub>4</sub> nanosheet arrays for low voltage hydrogen production through the ammonia oxidation reaction *MATERIALS CHEMISTRY FRONTIERS*  
Lim, Y., Surendran, S., So, W., Shanmugapriya, S., Jo, C., Janani, G., Choi, H., Han, H., Choi, H., Yun, Y., Kim, T., Kim, M., Jin, et al  
2023
- **Expanded solar absorption spectrum to improve photoelectrochemical oxygen evolution reaction: Synergistic effect of upconversion nanoparticles and ZnFe<sub>2</sub>O<sub>4</sub>/TiO<sub>2</sub>** *CHEMICAL ENGINEERING JOURNAL*  
Lim, Y., Lee, S., Kim, D., Han, M., Han, H., Kang, S., Kim, J., Sim, U., Park, Y.  
2022; 438
  - **Sharp-edged nanoflakes array of CuO with enhanced optical and charge transport properties for Bias-Free tandem solar Water-splitting** *APPLIED SURFACE SCIENCE*  
Hwang, S., Han, G., Cho, J., Lee, D., Han, H., Cho, I.  
2022; 585
  - **Facile fabrication of nanotubular heterostructure for enhanced photoelectrochemical performance** *CERAMICS INTERNATIONAL*  
Han, H., Park, W., Sivanantham, A., Hwang, S., Surendran, S., Sim, U., Cho, I.  
2021; 47 (3): 3972–77
  - **(020)-Textured tungsten trioxide nanostructure with enhanced photoelectrochemical activity** *JOURNAL OF CATALYSIS*  
Han, H., Park, W., Hwang, S., Kim, H., Sim, Y., Surendran, S., Sim, U., Cho, I.  
2020; 389: 328–36
  - **Fabrication of an ingenious metallic asymmetric supercapacitor by the integration of anodic iron oxide and cathodic nickel phosphide** *APPLIED SURFACE SCIENCE*  
Kim, H., Surendran, S., Chae, Y., Lee, H., An, T., Han, H., Park, W., Kim, J., Sim, U.  
2020; 511
  - **Retarded Charge-Carrier Recombination in Photoelectrochemical Cells from Plasmon-Induced Resonance Energy Transfer** *ADVANCED ENERGY MATERIALS*  
Choi, Y., Lee, B., Jung, M., Han, H., Kim, S., Chen, K., Kim, D., Heinz, T. F., Fan, S., Lee, J., Yi, G., Kim, J., Park, et al  
2020
  - **Tunable Dielectric and Thermal Properties of Oxide Dielectrics via Substrate Biasing in Plasma-Enhanced Atomic Layer Deposition.** *ACS applied materials & interfaces*  
Kim, Y. n., Kwon, H. n., Han, H. S., Kim, H. J., Kim, B. S., Lee, B. C., Lee, J. n., Asheghi, M. n., Prinz, F. B., Goodson, K. E., Lim, J. n., Sim, U. n., Park, et al  
2020
  - **Photo-annealed amorphous titanium oxide for perovskite solar cells.** *Nanoscale*  
Jeon, J. B., Kim, B. J., Bang, G. J., Kim, M., Lee, D. G., Lee, J. M., Lee, M., Han, H. S., Boschloo, G., Lee, S., Jung, H. S.  
2019
  - **Spontaneous generation of hydrogen peroxide from aqueous microdroplets.** *Proceedings of the National Academy of Sciences of the United States of America*  
Lee, J. K., Walker, K. L., Han, H. S., Kang, J., Prinz, F. B., Waymouth, R. M., Nam, H. G., Zare, R. N.  
2019
  - **Boosting the solar water oxidation performance of a BiVO<sub>4</sub> photoanode by crystallographic orientation control (vol 11, pg 1299, 2018)** *ENERGY & ENVIRONMENTAL SCIENCE*  
Han, H., Shin, S., Kim, D., Park, I., Kim, J., Huang, P., Lee, J., Cho, I., Zheng, X.  
2019; 12 (4): 1427
  - **Point defect-reduced colloidal SnO<sub>2</sub> electron transport layers for stable and almost hysteresis-free perovskite solar cells.** *RSC advances*  
Ju, Y., Park, S. Y., Han, H. S., Jung, H. S.  
2019; 9 (13): 7334-7337
  - **Point defect-reduced colloidal SnO<sub>2</sub> electron transport layers for stable and almost hysteresis-free perovskite solar cells** *RSC ADVANCES*  
Ju, Y., Park, S., Han, H., Jung, H.  
2019; 9 (13): 7334–37
  - **Facile and controllable surface-functionalization of TiO<sub>2</sub> nanotubes array for highly-efficient photoelectrochemical water-oxidation** *JOURNAL OF CATALYSIS*

- Kim, J., Han, H., Park, J., Park, W., Baek, J., Lee, J., Jung, H., Cho, I.  
2018; 365: 138–44
- **Enhancing Mo:BiVO<sub>4</sub> Solar Water Splitting with Patterned Au Nanospheres by Plasmon-Induced Energy Transfer** *ADVANCED ENERGY MATERIALS*  
Kim, J., Shi, X., Jeong, M., Park, J., Han, H., Kim, S., Guo, Y., Heinz, T. F., Fan, S., Lee, C., Park, J., Zheng, X.  
2018; 8 (5)
  - **Electrochemical generation of sulfur vacancies in the basal plane of MoS<sub>2</sub> for hydrogen evolution** *NATURE COMMUNICATIONS*  
Tsai, C., Li, H., Park, S., Park, J., Han, H. S., Norskov, J. K., Zheng, X., Abild-Pedersen, F.  
2017; 8
  - **One-Step Hydrothermal Deposition of Ni:FeOOH onto Photoanodes for Enhanced Water Oxidation** *ACS ENERGY LETTERS*  
Cai, L., Zhao, J., Li, H., Park, J., Cho, I. S., Han, H. S., Zheng, X.  
2016; 1 (3): 624-632
  - **Indium-Tin-Oxide Nanowire Array Based CdSe/CdS/TiO<sub>2</sub> One-Dimensional Heterojunction Photoelectrode for Enhanced Solar Hydrogen Production** *ACS SUSTAINABLE CHEMISTRY & ENGINEERING*  
Han, H. S., Han, G. S., Kim, J. S., Kim, D. H., Hong, J. S., Caliskan, S., Jung, H. S., Cho, I. S., Lee, J.  
2016; 4 (3): 1161-1168
  - **Enhancing Low-Bias Performance of Hematite Photoanodes for Solar Water Splitting by Simultaneous Reduction of Bulk, Interface, and Surface Recombination Pathways** *ADVANCED ENERGY MATERIALS*  
Cho, I. S., Han, H. S., Logar, M., Park, J., Zheng, X.  
2016; 6 (4)
  - **CdS-sensitized 1-D single-crystalline anatase TiO<sub>2</sub> nanowire arrays for photoelectrochemical hydrogen production** *1st International Conference on Nanotechnology, Nanomaterials and Thin Films for Energy Applications (Nano Energy)*  
Kim, D. H., Han, H. S., Cho, I. S., Seong, W. M., Park, I. J., Park, J. H., Shin, S., Do Park, G., Park, S., Lee, S., Hong, K. S.  
PERGAMON-ELSEVIER SCIENCE LTD.2015: 863–69
  - **A tree-like nanoporous WO<sub>3</sub> photoanode with enhanced charge transport efficiency for photoelectrochemical water oxidation** *JOURNAL OF MATERIALS CHEMISTRY A*  
Shin, S., Han, H. S., Kim, J. S., Park, I. J., Lee, M. H., Hong, K. S., Cho, I. S.  
2015; 3 (24): 12920-12926
  - **Facile Preparation of TiO<sub>2</sub> Nanobranch/Nanoparticle Hybrid Architecture with Enhanced Light Harvesting Properties for Dye-Sensitized Solar Cells** *JOURNAL OF NANOMATERIALS*  
Kim, J. S., Shin, S. S., Han, H. S., Shin, S., Suk, J. H., Kang, K., Hong, K. S., Cho, I. S.  
2015
  - **Ta-substituted SnNb<sub>2-x</sub>Ta<sub>x</sub>O<sub>6</sub> photocatalysts for hydrogen evolution under visible light irradiation** *JOURNAL OF MATERIALS CHEMISTRY A*  
Lee, C. W., Park, H. K., Park, S., Han, H. S., Seo, S. W., Song, H. J., Shin, S., Kim, D., Hong, K. S.  
2015; 3 (2): 825-831
  - **Nanostructured Ti-doped hematite (alpha-Fe<sub>2</sub>O<sub>3</sub>) photoanodes for efficient photoelectrochemical water oxidation** *INTERNATIONAL JOURNAL OF HYDROGEN ENERGY*  
Lee, M. H., Park, J. H., Han, H. S., Song, H. J., Cho, I. S., Noh, J. H., Hong, K. S.  
2014; 39 (30): 17501-17507
  - **In<sub>2</sub>O<sub>3</sub>:Sn/TiO<sub>2</sub>/CdS heterojunction nanowire array photoanode in photoelectrochemical cells** *INTERNATIONAL JOURNAL OF HYDROGEN ENERGY*  
Kim, J. S., Han, H. S., Shin, S., Han, G. S., Jung, H. S., Hong, K. S., Noh, J. H.  
2014; 39 (30): 17473-17480
  - **Heterojunction Fe<sub>2</sub>O<sub>3</sub>-SnO<sub>2</sub> Nanostructured Photoanode for Efficient Photoelectrochemical Water Splitting** *JOM*  
Han, H. S., Shin, S., Noh, J. H., Cho, I. S., Hong, K. S.  
2014; 66 (4): 664-669
  - **A Hierarchically Organized Photoelectrode Architecture for Highly Efficient CdS/CdSe-Sensitized Solar Cells** *ADVANCED ENERGY MATERIALS*  
Park, J. H., Kim, D. H., Shin, S. S., Han, H. S., Lee, M. H., Jung, H. S., Noh, J. H., Hong, K. S.  
2014; 4 (3)

- **Direct Printing Synthesis of Self-Organized Copper Oxide Hollow Spheres on a Substrate Using Copper(II) Complex Ink: Gas Sensing and Photoelectrochemical Properties** *LANGMUIR*  
Choi, Y., Kim, D., Han, H. S., Shin, S., Hong, S., Hong, K. S.  
2014; 30 (3): 700-709
- **1-D Structured Flexible Supercapacitor Electrodes with Prominent Electronic/Ionic Transport Capabilities** *ACS APPLIED MATERIALS & INTERFACES*  
Kim, J. S., Shin, S. S., Han, H. S., Oh, L. S., Kim, D. H., Kim, J., Hong, K. S., Kim, J. Y.  
2014; 6 (1): 268-274
- **Surface-area-tuned, quantum-dot-sensitized heterostructured nanoarchitectures for highly efficient photoelectrodes** *NANO RESEARCH*  
Park, S., Kim, D., Lee, C. W., Seo, S., Kim, H. J., Han, H. S., Hong, K. S., Kim, D.  
2014; 7 (1): 144-153
- **TiO<sub>2</sub> nanocrystals shell layer on highly conducting indium tin oxide nanowire for photovoltaic devices (vol 5, pg 3520, 2013)** *NANOSCALE*  
Han, H. S., Kim, J. S., Kim, D. H., Han, G. S., Jung, H. S., Noh, J. H., Hong, K. S.  
2013; 5 (24): 12674-12674
- **Aligned Photoelectrodes with Large Surface Area Prepared by Pulsed Laser Deposition** *JOURNAL OF PHYSICAL CHEMISTRY C*  
Noh, J. H., Park, J. H., Han, H. S., Kim, D. H., Han, B. S., Lee, S., Kim, J. Y., Jung, H. S., Hong, K. S.  
2012; 116 (14): 8102-8110
- **Facile hydrothermal synthesis of InVO<sub>4</sub> microspheres and their visible-light photocatalytic activities** *MATERIALS LETTERS*  
Noh, T. H., Kim, D. W., Seo, S. W., Cho, I. S., Kim, D. H., Han, H. S., Hong, K. S.  
2012; 72: 98-100
- **Tin doped indium oxide core-TiO<sub>2</sub> shell nanowires on stainless steel mesh for flexible photoelectrochemical cells** *APPLIED PHYSICS LETTERS*  
Noh, J. H., Ding, B., Han, H. S., Kim, J. S., Park, J. H., Park, S. B., Jung, H. S., Lee, J., Hong, K. S.  
2012; 100 (8)
- **Nanowire-Based Three-Dimensional Transparent Conducting Oxide Electrodes for Extremely Fast Charge Collection** *ADVANCED ENERGY MATERIALS*  
Noh, J. H., Han, H. S., Lee, S., Kim, J. Y., Hong, K. S., Han, G., Shin, H., Jung, H. S.  
2011; 1 (5): 829-835
- **A Newly Designed Nb-Doped TiO<sub>2</sub>/Al-Doped ZnO Transparent Conducting Oxide Multi layer for Electrochemical Photoenergy Conversion Devices** *JOURNAL OF PHYSICAL CHEMISTRY C*  
Noh, J. H., Han, H. S., Lee, S., Kim, D. H., Park, J. H., Park, S., Kim, J. Y., Jung, H. S., Hong, K. S.  
2010; 114 (32): 13867-13871
- **Tailoring the Morphology and Structure of Nanosized Zn<sub>2</sub>SiO<sub>4</sub>: Mn<sup>2+</sup> Phosphors Using the Hydrothermal Method and Their Luminescence Properties** *JOURNAL OF PHYSICAL CHEMISTRY C*  
An, J., Noh, J. H., Cho, I., Roh, H., Kim, J. Y., Han, H. S., Hong, K. S.  
2010; 114 (23): 10330-10335
- **Enhancing the Densification of Nanocrystalline TiO<sub>2</sub> by Reduction in Spark Plasma Sintering** *JOURNAL OF THE AMERICAN CERAMIC SOCIETY*  
Noh, J. H., Jung, H. S., Cho, I., An, J., Cho, C. M., Han, H. S., Hong, K. S.  
2010; 93 (4): 993-997
- **Photoluminescence and electrical properties of epitaxial Al-doped ZnO transparent conducting thin films** *PHYSICA STATUS SOLIDI A-APPLICATIONS AND MATERIALS SCIENCE*  
Noh, J. H., Cho, I., Lee, S., Cho, C. M., Han, H. S., An, J., Kwak, C. H., Kim, J. Y., Jung, H. S., Lee, J., Hong, K. S.  
2009; 206 (9): 2133-2138
- **Nb-Doped TiO<sub>2</sub>: A New Compact Layer Material for TiO<sub>2</sub> Dye-Sensitized Solar Cells** *JOURNAL OF PHYSICAL CHEMISTRY C*  
Lee, S., Noh, J. H., Han, H. S., Yim, D. K., Kim, D. H., Lee, J., Kim, J. Y., Jung, H. S., Hong, K. S.  
2009; 113 (16): 6878-6882
- **Functional Multilayered Transparent Conducting Oxide Thin Films for Photovoltaic Devices** *JOURNAL OF PHYSICAL CHEMISTRY C*  
Noh, J. H., Lee, S., Kim, J. Y., Lee, J., Han, H. S., Cho, C. M., Cho, I. S., Jung, H. S., Hong, K. S.  
2009; 113 (3): 1083-1087