Curriculum Vitae

Hyun You Kim

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Department of Materials Science and Engineering (MSE)	kimhy@cnu.ac.kr	February 2022
Chungnam National University (CNU)	**Webpage**	
Daejeon, Korea	www.cnucmsl.com	

CURRENT STATUS

Professor of MSE, CNU

99 Daehak-ro, Yuseong-gu, Daejeon 34134, Republic of Korea (South Korea)

EDUCATION

- 2005. 03 - 2009. 08: Korea Advanced Institute of Science and Technology (KAIST), Ph.D. in MSE (Advisor: Prof. Hyuck Mo Lee)
- 2003.03 - 2005. 02: KAIST, M.S. in MSE (Advisor: Prof. Hyuck Mo Lee)
- 1998. 03 - 2003. 02: Korea University, B.S. in Materials science and engineering

WORK EXPERIENCE

- 2022. 03 ~ present: Professor, MSE, CNU, Korea
- 2014. 03 – 2022. 02: Assistant/Associate Professor, MSE, CNU, Korea
- 2012. 10 – 2014. 02: Research Associate, Brookhaven National Laboratory, USA (Supervisor: Dr. Mark M. Hybertsen, Dr. Ping Liu)
- 2010. 04 – 2012. 09: Postdoctoral Researcher, The University of Texas at Austin, USA (Supervisor: Prof. Graeme Henkelman)
- 2009. 09 – 2010. 03: Postdoctoral Researcher, KAIST, Korea (Supervisor: Prof. Hyuck Mo Lee)
- 2007. 05 –2007. 10: Visiting Student, University of California Santa Barbara, USA (Advisor: Prof. Horia Metiu)

RECENT PUBLICATIONS (5)

(1) Siwon Lee, Hyunwoo Ha, Kyung Taek Bae, Seunghyun Kim, Hyuk Choi, Juhyeok Lee, Jun Hyuk Kim, Jongsu Seo, Jin Seok Choi, Yong-Ryun Jo, Bong-Joong Kim, Yongsoo Yang, Kang Taek Lee*, **Hyun You Kim***, and WooChul Jung*
A Measure of Active Interfaces in Supported Catalysts for High-temperature Reactions
Chem, 8, 815 (2022)

(2) Jeongjin Kim, Hyunwoo Ha, Won Hui Doh, Kohei Ueda, Kazuhiko Mase, Hiroshi Kondoh, Bongjin Simon Mun*, **Hyun You Kim*** and Jeong Young Park*
How Rh surface breaks CO_2 molecules under ambient pressure
Nature Communications, 11, 5649 (2020)

(3) Mi Yoo, Young-Sang Yu, Hyunwoo Ha, Siwon Lee, Jin-Seok Choi, Sunyoung Oh, Eunji Kang, Hyuk Choi, Hyesung An, Kug-Seung Lee, Jeong Young Park, Richard Celestre, Matthew A. Marcus, Kasra Nowrouzi, Doug Taube, David A. Shapiro, WooChul Jung*, Chunjoong Kim*, and **Hyun You Kim***
A Tailored Oxide Interface Creates Dense Pt Single-Atom Catalysts with High Catalytic Activity
Energy & Environmental Science, 13, 1231 (2020)

(4) Yoonseok Choi, Seung Keun Cha, Hyunwoo Ha, Siwon Lee, Hyun Kook Seo, Jeong Yong Lee, **Hyun You Kim***, Sang Ouk Kim*, and WooChul Jung*
Unraveling Inherent Electrocatalysis of Mixed-conducting Oxide Activated by Metal Nanoparticle for Fuel Cell Electrodes
Nature Nanotechnology, 14, 245 (2019)

(5) Sinmyung Yoon, Hyunwoo Ha, Kwangjin An*, and **Hyun You Kim***
Catalytic CO oxidation over Au nanoparticles supported on CeO_2 nanocrystals: Effect of the Au-CeO_2 interface
ACS Catalysis, 8, 11491 (2018)

RESEARCH INTERESTS & EXPERTISE

Materials design from fundamentals (computational materials science)

- Computational design of functional nanomaterials in atomic precision

- Combinatorial research of experiment and theory for the rational design of functional materials

- Understanding the structure-property relationship using the first principle calculation and the data science

Experimental design of high-performance single-atom catalysts

- Synthesis of high-density Pt single-atom catalysts

- Rational design of metal-oxide interfaces for catalytic optimization of single atoms

- In situ DRIFTS Infrared spectroscopy analysis of the surface reactive species

Combinatorial study of theory and experiment

- Design of high-performance functional materials:Perovskite LED; ALD processes; SOFC; Catalysts for CO_2 conversion, Chemical H_2 production, Water-splitting, and C1 chemistry; Li-ion batteries; Graphene growth; Thin films

- Combinatorial design of high-performance precious metal single-atom catalysts

- Theoretical analysis of the catalytic function of metal-oxide-based heterogeneous catalysts

- Rational design of heterogeneous catalysts by a combinatorial study of theory and experiment

***Operando/in situ* X-ray analysis**

- Synchrotron-based operando/in situ X-ray analysis

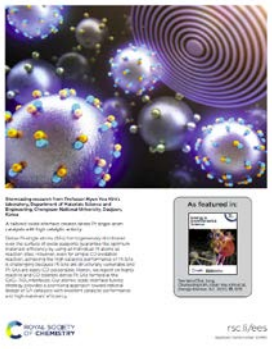
- X-ray absorption spectroscopy (XAS), Scanning Transmission X-ray Microscopy (STXM)

RESEARCH HIGHLIGHTS

Design of interface-confined high-performance Pt single-atom catalysts

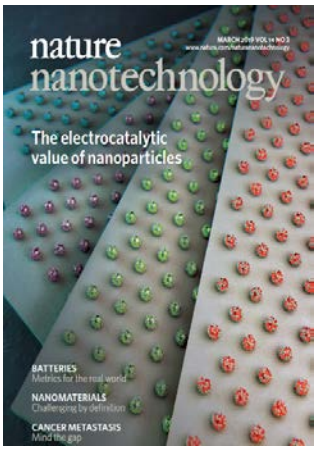
- Combinatorial study of density functional theory calculation, experimental catalyst design, and *operando* synchrotron-based X-ray analysis

- Densely formed Pt single-atoms with improved stability and record-high activity were successfully designed through interface engineering



- Published in *Energy Environ. Sci.* (April 2020, back cover highlighted), *J. Mater. Chem. A* (March 2022, Front cover highlighted, Invited single-atom catalysis special issue), *J. Phys. Chem. Lett.* (February 2022).

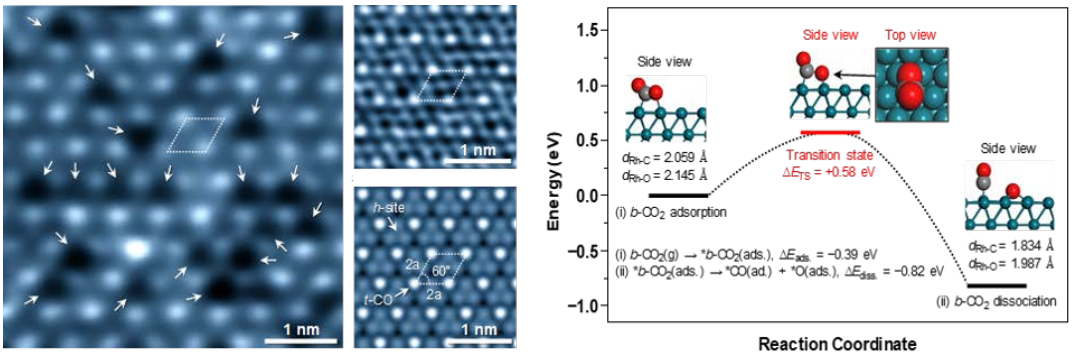
Unraveling the catalytic role of metal-oxide interfaces in high-temperature reactions for solid oxide fuel cell



- Combinatorial study of density functional theory calculation, experimental catalyst design, *in situ* TEM and 3D image analysis, and *operando* X-ray analysis
- Understanding the catalytic function of the Pt-ceria interfaces for H_2 oxidation
- Quantitative analysis of the role of Pt-ceria interfaces and Pt surfaces for CH_4 oxidation
- Published in *Nat. Nanotechnol.* (March 2019, front cover highlighted) and *Chem* (March 2022)

Understanding the fundamentals of catalytic CO_2 activation

- Combinatorial study of density functional theory calculation, *operando* synchrotron-based X-ray analysis, and ambient pressure STM
- Comprehensive understanding of the mechanism of CO_2 activation and dissociation on Rh and TiO_2 surfaces
- Cross-confirming the STM observations with density functional theory calculations and corresponding STM simulations
- Published in *Nat. Commun.* (November 2020), *ACS Catal.* (December 2022)



Theoretical analysis of functional materials

- Supporting relevant experimental findings/Enriching the science behind the experimental observations
- Understanding the physics and chemistry of: Perovskite-based LED materials (*Chem. Eng. J.* 2020); Perovskite Solar Cell (*Chem. Eng. J.* 2023); SOFC electrodes (*Chem* 2022); CO_2 activation (*Nat. Commun.* 2022); ALD processes (*Chem. Mater.* 2020, *ACS Appl. Mater. Inter.* 2018); Graphene growth (*Adv. Sci.* 2021, *ACS Nano* 2018); Electrocatalysis (*ACS Nano* 2022)

FULL PUBLICATION LIST

Google scholar profile (*h*-index: 35, i10-index: 67)
https://scholar.google.co.kr/citations?user=bPRIxQsAAAAJ&hl=en

Group web site
https://www.cnucmsl.com/publications

RECENT PUBLICATIONS (2019 to present)

Corresponding author: denoted with *, Contributing author: colored in gray

(1) Se-Ho Kim†, Kihyun Shin†, Xuyang Zhou, Chanwon Jung, **Hyun You Kim**, Stella Pedrazzini, Michelle Conroy, Graeme Henkelman, and Baptiste Gault*

Atom probe analysis of $BaTiO_3$ enabled by metallic shielding

Scripta Materialia, Accepted (2023)

(2) Habib Ullah, Zakir Ullah, Zafar A. K. Khattak, Mohsin Ali Marwat, Baoyi Yu, Hyung Wook Kwon, **Hyun You Kim***, and Francis Verpoort*

Formation of Value-added Cyclic Carbonates via Coupling of Epoxides and CO_2 by Ruthenium Pincer Hydrazone Complexes under Atmospheric Pressure

Energy & Fuels, 37, 2178 (2023)

(3) Ari Shin, Bong-Kyu Kim, Minkyoung Kim, Minkyung Jeong, Donggil Lee, Hyunwoo Ha, Soo Yeol Lee, Chunjoong Kim, Soo hyung Park, **Hyun You Kim**, Chang-Yong Nam, and Jun Hyun Han*

Microstructural and physicochemical origins of electroless copper deposition on graphite enhanced by acid pretreatment

Materials Chemistry and Physics, 295, 1 (2023)

(4) Hochan Song, Seul Gi Lim, Jonghee Yang, Jeongjae Lee, Hyuk Choi, Ju Hyeok Lee, **Hyun You Kim***, Bo Ram Lee*, and Hyosung Choi*

On the surface passivating principle of functional thiol towards efficient and stable perovskite nanocrystal solar Cells

Chemical Engineering Journal, 454, 140224 (2023)

(5) Eunji Kang†, Jungwoo Choi†, Hyuk Choi†, Jieun Yun, Ju Hyeok Lee, Mi Yoo, Hyuck Mo Lee*, and **Hyun You Kim***

Gold Single-Atoms Confined at the CeO_x-TiO_2 Interfaces with Enhanced Low-Temperature Activity toward CO Oxidation

Nanotechnology, 34, 45703 (2023)

(6) Xiao Tong, Scott P. Price, Jeremy C. Robins, Claron Ridge, **Hyun You Kim**, Paul Kemper, Horia Metiu, Michael T. Bowers, and Steven K. Buratto*

VO-Stabilized H_2O Adsorption on a TiO_2 (110) Surface at Room Temperature

Journal of Physical Chemistry C, 126, 17975 (2022)

(7) Ye Eun Jeon†, You Na Ko†, Jongseok Kim, Hyuk Choi, Wonhee Lee, Young Eun Kim, Doohwan Lee, **Hyun You Kim**, and Ki Tae Park*

Selective Production of Ethylene from CO_2 over CuAg Tandem Electrocatalysts

Journal of Industrial and Engineering Chemistry, 116, 191 (2022)

(8) Daniel Tan, Wonhee Lee, Young Eun Kim, You Na Ko, Min Hye Youn, Ye Eun Jeon, Jumi Hong, Jeong Eun Park, Jaeho Seo, Soon Kwan Jeong, Yejung Choi, Hyuk Choi, **Hyun You Kim***, Ki Tae Park*

In-Bi Electrocatalyst for the Reduction of CO_2 to Formate in a Wide Potential Window

ACS Applied Materials & Interfaces, 14, 28890 (2022)

(9) Dung Van Dao, Hyuk Choi, Thuy T. D. Nguyen, Sang-Woo Ki, Gyu-Cheol Kim, Hoki Son, Jin-Kyu Yang, Yeon-Tae Yu, **Hyun You Kim***, and In-Hwan Lee*

Light to Light-to-Hydrogen Improvement Based on Three-Factored Au@CeO_2/Gr Hierarchical Photocatalysts

ACS Nano, 16, 7848 (2022)

(10) Mi Yoo†, Eunji Kang†, Hyunwoo Ha†, Jieun Yun†, Hyuk Choi, Tae Jun Kim, Jiho Min, Jin-Seok Choi, Kug-Seung Lee, Namgee Jung, Sungtak Kim, Chunjoong Kim, Young-Sang Yu*, and **Hyun You Kim***

Interspersing CeO_x clusters to the Pt-TiO_2 interfaces for catalytic promotion of TiO_2-supported Pt nanoparticles

Journal of Physical Chemistry Letters, 13, 1719 (2022)

(11) Siwon Lee‡, Hyunwoo Ha‡, Kyung Taek Bae‡, Seunghyun Kim, Hyuk Choi, Juhyeok Lee, Jun Hyuk Kim, Jongsu Seo, Jin Seok Choi, Yong-Ryun Jo, Bong-Joong Kim, Yongsoo Yang, Kang Taek Lee*, **Hyun You Kim***, and WooChul Jung*

A Measure of Active Interfaces in Supported Catalysts for High-temperature Reactions

Chem, 8, 815 (2022)

(12) Mi Yoo‡, Eunji Kang‡, Hyuk Choi‡, Hyunwoo Ha, Hanseul Choi, Jin-Seok Choi, Kug-Seung Lee, Richard Celestre, David A. Shapiro, Jeong Young Park*, Chunjoong Kim*, Young-Sang Yu*, and **Hyun You Kim***

Enhancing the inherent catalytic activity and stability of TiO_2 supported Pt single-atoms at CeO_x-TiO_2 interfaces

Journal of Materials Chemistry A, 10, 5942 (2022)

(13) Sinmyung Yoon‡, Hyunwoo Ha‡, Jihun Kim, Eonu Nam, Mi Yoo, Beomgyun Jeong, **Hyun You Kim***, and Kwangjin An*

Influence of Pt Size and CeO_2 Morphology at the Pt-CeO_2 Interface in CO Oxidation

Journal of Materials Chemistry A, 9, 26381 (2021)

(14) Woo Seok Yang*, Seungoh Han, Gyu-Ri Lim, **Hyun You Kim**, Sung-Hoon Hong

Effects and Mechanism of Surface Water Wettability and Operating Frequency on Response Linearity of Flexible IDE Capacitive Humidity Sensor

Sensors, 21, 6633 (2021)

(15) Ha Tran Huu, Ngoc Hung Vu, Hyunwoo Ha, Joonhe Moon, **Hyun You Kim**, and Won Bin Im*

Sub-micro droplet reactors for green synthesis of Li_3VO_4 anode materials in lithium ion batteries

Nature Communications, 12, 3081 (2021)

(16) Yire Han, Byeong-Ju Park, Ji-Ho Eom, Venkatraju Jella, Swathi Ippili, SVN Pammi, Jin-Seok Choi, Hyunwoo Ha, Hyuk Choi, Cheolho Jeon, Kangho Park, Hee-Tae Jung, Sungmi Yoo, **Hyun You Kim***, Yun Ho Kim*, and Soon-Gil Yoon*

Direct Growth of Highly Conductive Large-Area Stretchable Graphene

Advanced Science, 8, 2003697 (2021)

(17) Dung Van Dao, Thuy T. D. Nguyen, Periyayya Uthirakumar, Yeong-Hoon Cho, Gyu-Cheol Kim, Jin-Kyu Yang, Duy-Thanh Tran, Thanh Duc Le, Hyuk Choi, **Hyun You Kim**, Yeon-Tae Yu, and In-Hwan Lee*

Insightful understanding of hot-carrier generation and transfer in plasmonic Au@CeO_2 core-shell photocatalysts for light-driven hydrogen evolution improvement

Applied Catalysis B: Environmental, 286, 119947 (2021)

(18) N. S. M. Viswanath, G. Krishnamurthy Grandhi, Ha Tran Huu, Hyuk Choi, Ha Jun Kim, **Hyun You Kim***, Chan-Jin Park*, and Won Bin Im*

Zero-Thermal-Quenching and Improved Chemical Stability of a UCr4C4-Type Phosphor via Crystal Site Engineering

Chemical Engineering Journal, 420, 127664 (2021)

(19) Young-Ahn Lee, Seungik Han, Le Thai Duy, Hyesung An, Jucheol Park, Ranveer Singh, **Hyun You Kim**, and Hyungtak Seo*

Confined Interfacial Alloying of Multilayered Pd-Ni Nanocatalyst for Widening Hydrogen Detection Capacity

Sensors & Actuators B: Chemical, 330, 129378 (2021)

(20) Hyeong Jin Kim, Hyuk Choi, Abhishek Kumar Sharma, Won G. Hong, Koo Shin, Hocheol Song, **Hyun You Kim**, and Young Joon Hong*

Recyclable aqueous metal adsorbent: Synthesis and Cu(II) sorption characteristics of ternary nanocomposites of Fe3O4 nanoparticles@graphene–poly-N-phenylglycine nanofibers

Journal of Hazardous Materials, 401, 123283 (2021)

(21) Jeongjin Kim‡, Hyunwoo Ha‡, Won Hui Doh‡, Kohei Ueda, Kazuhiko Mase, Hiroshi Kondoh, Bongjin Simon Mun*, **Hyun You Kim*** and Jeong Young Park*

How Rh surface breaks CO_2 molecules under ambient pressure

Nature Communications, 11, 5649 (2020)

(22) Jung-Hoon Lee, Jiazhen Sheng, Hyesung An, TaeHyun Hong, **Hyun You Kim**, HyunKyung Lee, Jang Hyeon Seok, Jung Woo Park, Jun Hyung Lim*, and Jin-Seong Park*

Metastable Rhombohedral Phase Transition of Semiconducting Indium Oxide Controlled by Thermal Atomic Layer Deposition

Chemistry of Materials, 32, 7397 (2020)

(23) Yeongran Hong, Damien Thirion, Saravanan Subramanian, Mi Yoo, Hyuk Choi, **Hyun You Kim**, J. Fraser Stoddart, and Cafer T. Yavuz*

Precious metal recovery from electronic waste by a porous porphyrin polymer

Proceedings of the National Academy of Sciences of the United States of America, 117, 16174 (2020)

(24) Hayk H. Nersisyan, Jong Hyeon Lee*, **Hyun You Kim**, Seunghwa Ryu, and Bung Uk Yoo

Morphological Diversity of AlN Nano- and Microstructures: Synthesis, Growth Orientations and Theoretical Modeling

International Materials Reviews, 65, 323 (2020)

(25) Van-Toan Nguyen‡, Hyunwoo Ha‡, Ngoc-Anh Nguyen, Hyesung An, **Hyun You Kim***, and Ho-Suk Choi*,

In situ Engineering of Graphene-Dot-Armored Pd Nanosponge using Br- toward High-Performance and Stable Electrocatalyst for Hydrogen Evolution Reaction

ACS Applied Materials & Interfaces, 12, 15500 (2020)

(26) Mi Yoo‡, Young-Sang Yu‡, Hyunwoo Ha‡, Siwon Lee‡, Jin-Seok Choi, Sunyoung Oh, Eunji Kang, Hyuk Choi, Hyesung An, Kug-Seung Lee, Jeong Young Park, Richard Celestre, Matthew A. Marcus, Kasra Nowrouzi, Doug Taube, David A. Shapiro, WooChul Jung*, Chunjoong Kim*, and **Hyun You Kim***

A tailored oxide interface creates dense Pt single-atom catalysts with high catalytic activity

Energy & Environmental Science, 13, 1231 (2020)

(27) Sungmin Woo, Hyuk Choi, Seunghun Kang, Jegon Lee, Adrian David, Wilfrid Prellier, Yunseok Kim, **Hyun You Kim**, and Woo Seok Choi*,

Surface-orientation-dependent growth of $SrRuO_3$ epitaxial thin films

Applied Surface Science, 499, 143924 (2020)

(28) Kwangmo Go, Kihyeon Bae, Hyuk Choi, **Hyun You Kim***, and Kyung Jin Lee*

Solar to steam generation via porous black membrane with tailored pore structures

ACS Applied Materials & Interfaces, 11, 48300 (2019)

(29) Sunyoung Oh‡, Hyunwoo Ha‡, Hanseul Choi, Changbum Jo, Jangkeun Cho, Hyuk Choi, Ryong Ryoo*, **Hyun You Kim***, and Jeong Young Park*,

Oxygen Activation on the Interface between Pt Nanoparticle and Mesoporous Defective TiO_2 during CO Oxidation

Journal of Chemical Physics, 151, 234716 (2019)

(30) Hyesung An‡, Mi Yoo‡, Hyunwoo Ha‡, Hyuk Choi, Eunji Kang, and **Hyun You Kim***

Efficient Sn Recovery from SnO_2 by Alkane ($C_xH_{y=2x+2}$, $0 \leq x \leq 4$) Reduction

Scientific Reports, 9,16702 (2019)

(31) Jaemin Lee, Eunbyeol Seo, Mi Yoo, Sohee Kim, Jihyun Choi, Hyunsook Jung, Hae Wan Lee, Hyuck Mo Lee, **Hyun You Kim***, Bumjae Lee, and Kyung Jin Lee*

Preparation of non-woven nanofiber webs for detoxification of nerve gases

Polymer, 179, 121664 (2019)

(32) Hayk H. Nersisyan, Wan Bae Kim, Seong Hun Lee, Bung Uk Yoo, Hyuck Choi, **Hyun You Kim**, and Jong Hyeon Lee*

Control and theoretical modeling of the growth process of AlN six-fold and multifold armed dendritic crystals

Crystal Growth & Design, 19, 3244 (2019)

(33) Yoonseok Choi, Seung Keun Cha, Hyunwoo Ha, Siwon Lee, Hyun Kook Seo, Jeong Yong Lee, **Hyun You Kim***, Sang Ouk Kim*, and WooChul Jung*,

Unraveling Inherent Electrocatalysis of Mixed-conducting Oxide Activated by Metal Nanoparticle for Fuel Cell Electrodes

Nature Nanotechnology, 14, 245 (2019)

(34) Sun Mi Kim‡, Jeong Ho Mun‡, Si Woo Lee‡, Hyesung An‡, **Hyun You Kim***, Sang Ouk Kim*, and Jeong Young Park*

Compositional Effect of Two-dimensional Monodisperse AuPd Bimetallic Nanoparticle Arrays Fabricated by Block Copolymer Nanopatterning on Catalytic Activity of CO Oxidation

Chemical Communications, 54, 13734 (2018)

(35) Bung Uk Yoo, Young Jun Lee, Vladislav Ri, Seong Hun Lee, Hayk Nersisyan, **Hyun You Kim**, Jong Hyeon Lee*, Nicholas Earner, Alister MacDonald

Minimising oxygen contamination through a liquid copper-aided group IV metal production process

Scientific Reports, 8, 17391 (2018)

(36) Min-Ju Choi, Ji-Ho Eom, Sung-Ho Shin, Junghyo Nah, Jin-Seok Choi, Hyun-A Song, Hyesung An, **Hyun You Kim**, S. V. N. Pammi, Goeun Choi, Jin-Ho Choy, Ippili Swathi, Venkatraju Jella,Byeong-Ju Park, Jihoon Choi, and Soon-Gil Yoon*

Most Facile Synthesis of Zn-Al:LDHs Nanosheets at Room Temperature via Environmentally Friendly Process and Their High Power Generation by Flexoelectricity

Materials Today Energy, 10, 254 (2018)

(37) Sinmyung Yoon, Hyunwoo Ha, Kwangjin An*, and **Hyun You Kim***,

Catalytic CO oxidation over Au nanoparticles supported on CeO_2 nanocrystals: Effect of the Au-CeO_2 interface

ACS Catalysis, 8, 11491 (2018)

(38) Jung-Hoon Lee, Mi Yoo, DongHee Kang, Hyun-Mo Lee, Wan-ho Choi, Jung Woo Park, Jongryul Park,

Selective SnO_x Atomic Layer Deposition Driven by Oxygen Reactants

ACS Applied Materials & Interfaces, 10, 33335 (2018)

(39) Quoc Chinh Tran, Hyesung An, Hyunwoo Ha, Van Toan Nguyen, Nguyen Duc Quang, **Hyun You Kim***, and Ho-Suk Choi*,

Robust graphene-wrapped PtNi nanosponge for enhanced oxygen reduction reaction performance

Journal of Materials Chemistry A, 6, 8259 (2018)

(40) Byeong-Ju Park, Jin-Seok Choi, Ji-Ho Eom, Hyunwoo Ha, **Hyun You Kim**, Seonhee Lee, Hyunjung Shin, and Soon-Gil Yoon*

Defect-Free Graphene Synthesized Directly at 150 °C via Chemical Vapor Deposition with No Transfer

ACS Nano, 12, 2008 (2018)