

**Personal Information**

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Harshad Bandal

Work Experience

13 Aug 2020- Present

Research Professor

Environmental Waste Recycle Institute
Myongji University, Yongin, Republic of Korea

1 Oct 2018- 1 Aug 2020

D.S. Kothari Postdoctoral fellow

Savitribai Phule Pune University, Pune (India)
Project title: "Facile Synthesis of Fe/ N Doped Carbon Foams for Efficient Electrocatalytic Oxygen Evolution Reaction."

10 Aug 2012- 9 Feb 2015

Project Fellow

National Chemical Laboratory, Pune (India)
Project title: "Development of Non-Hazardous Process for Synthesis of Dimethyl Carbonate from Urea and Methanol."

Education

Feb 2015–Feb2018

Ph.D. (Oxygen evolution reaction)

Thesis title: Designed Synthesis of Fe-based Heterogeneous Electrocatalysts for Oxygen Evolution Reaction
PhD Guide: Professor Hern Kim
Myongji University, Yongin, Republic of Korea

July 2010–April 2012

M.Sc. (Inorganic chemistry), 1st class 64 %

Savitribai Phule Pune University (formally University of Pune), Pune (India)

MSc. Project: "Acetylation of glycerol with acetic acid using functionalized ionic liquids"

July 2007–April 2010

B.Sc. (Chemistry) , 1st class 69 %

Savitribai Phule Pune University (formally University of Pune), Pune (India)

Awards & Honours

D.S. Kothari Postdoctoral fellow

Best paper award at International conference on Geoscience, energy and materials (April 2017), Malaysia

Communication skills

Good communication skills gained through working in research group containing peoples from different educational background and nationalities

Languages

Marathi, Hindi, English

Research Skills

- Instruments operated: Electrochemical workstation Gas chromatography, High performance liquid chromatography, UV-

Visible spectroscope, FT-IR spectroscope, Karl-Fischer Titrator, Raman Microscope, BET surface area analyser

- Techniques Used: X-ray diffraction spectroscopy, Scanning electron microscopy, Transmission electron microscopy, X-ray photoelectron spectroscopy, Thermogravimetric analysis, Differential scanning calorimetry

Publication Summary

Total papers: 18

Citation: 518

H index: 13

i10 index: 14

References

Professor Kim Hern

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Myongji University,
Myongji-ro Cheoin-gu, Yongin, Gyeonggi-do
17058, (Republic of Korea)
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Dr. V. H. Rane

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National Chemical Laboratory
Dr. Homi Bhabha Road, Pune- 411008
Maharashtra (INDIA)
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Scientist-F (Retired)
National Chemical Laboratory
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List of Publications

Journal Articles

- 1 Spinel type Fe₃O₄ polyhedron supported on nickel foam as an electrocatalyst for water oxidation reaction, AA Pawar, **HA Bandal**, H Kim, *J. alloy and comp.* **863** (2021), 158742 (IF=5.31), shared 1st author
- 2 Bimetallic iron cobalt oxide self-supported on Ni-Foam: An efficient bifunctional electrocatalyst for oxygen and hydrogen evolution reaction, **H A Bandal**, Amol R. Jadhav, Asif H. Tamboli, Hern Kim, *Electrochimica Acta* **249** (2017) 253–262 (IF=6.90), 1st author
- 3 Ionic Liquid-Derived Co₃O₄-N/S-Doped Carbon Catalysts for the Enhanced Water Oxidation, AA Chaugule, VS Mane, **HA Bandal**, H Kim, AS Kumbhar, *ACS Sustain. Chem. Eng* **7** (2019), 14889-14898, (IF=8.19), co-author
- 4 Recent trends in electrochemical sensors for vital biomedical markers using hybrid nanostructured materials, KK Reddy, **HA Bandal**, M Satyanarayana, KY Goud, KV Gobi, T Jayaramudu, J Amalraj, H Kim, *Adv. Sci.* **7** (2020), 1902980 (IF=16.8), co-author
- 5 Fe₂O₃ hollow nanorods/CNT composites as an efficient electrocatalyst for oxygen evolution reaction, **H.A. Bandal**, A.R. Jadhav, A.A. Chaugule, W-J. Chung, H. Kim, *Electrochimica Acta* **222** (2016) 1316–1325 (IF=6.9), 1st author

- 6 Cobalt impregnated magnetite-multiwalled carbon nanotube nanocomposite as magnetically separable efficient catalyst for hydrogen generation by NaBH_4 hydrolysis, **Harshad A. Bandal**, Amol R. Jadhav, Hern Kim, *J. alloy and comp.* **699** (2017) 1057-1067 (IF=5.31), 1st author
- 7 Iron-based heterogeneous catalysts for oxygen evolution reaction; change in perspective from activity promoter to active catalyst, **Harshad Bandal**, K. Koteswara Reddy, Avinash Chaugule, Hern Kim, *Journal of Power Sources* **395** (2018) 106–127 (IF=9.12), 1st author
- 8 Mn nanoparticles decorated on the ionic liquid functionalized multiwalled carbon nanotubes as a supercapacitor electrode material, Amutha Chinnappan, **Harshad Bandal**, Hern Kim, Seeram Ramakrishna, *Chem. Eng. J.* **316** (2017) 928–935 (IF=13.27), co-author
- 9 Facile synthesis of polypyrrole/ionic liquid nanoparticles and use as an electrocatalyst for oxygen evolution reaction, Amutha Chinnappan, **Harshad Bandal**, Seeram Ramakrishna, Hern Kim, *Chem. Eng. J.* **335** (2018) 215-220 (IF=10.6), shared 1st author
- 10 Diethylenetriamine assisted synthesis of mesoporous Co and Ni-Co spinel oxides as an electrocatalysts for methanol and water oxidation, Amol R. Jadhav, **Harshad A. Bandal**, Avinash A. Chaugule, Hern Kim, *Electrochimica Acta* **240** (2017) 277–287 (IF=6.9), co-author
- 11 Facile synthesis of bicontinuous Ni_3Fe alloy for efficient electrocatalytic oxygen evolution reaction, **Harshad Bandal**, Amol R. Jadhav, Hern Kim, *J. alloy and comp.* **726** (2017) 875-874 (IF= 5.31) 1st author
- 12 Environment friendly hydrothermal synthesis of carbon- Co_3O_4 nanorods composite as an efficient catalyst for oxygen evolution reaction, Amol R. Jadhav, **Harshad Bandal**, Ashif H. Tamboli, Hern Kim, *J. of Energy Chem.* **26** (2017) 695–702 (IF=9.67), co-author
- 13 Synthesis of substituted amines: Catalytic reductive amination of carbonyl compounds using Lewis acid Zn-Co-double metal cyanide/polymethylhydrosiloxane, Amol R. Jadhav, **Harshad A. Bandal**, Hern Kim, *Chem. Eng. J.* **295** (2016) 376–383 (IF=13.27), co-author
- 14 Highly efficient synthesis of dimethyl carbonate from methanol and carbon dioxide using IL/DBU/ SmOCl as a novel ternary catalytic system, Avinash A. Chaugule, **Harshad Bandal**, Ashif H. Tamboli, Wook- Jin Chung, Hern Kim, *Catal. Commun.* **75** (2016), 87-91 (IF=3.62), co-author
- 15 Cobalt nanoparticles supported on magnetic coreshell structured carbon as a highly efficient catalyst for hydrogen generation from NaBH_4 hydrolysis, Bo Chen, Sijiang Chen, **Harshad Bandal**, Richard Appiah-Ntiamoah, Amol R. Jadhav, Hern Kim, *Int. J. hydrogen energy* **43** (2018) 929 6-9306 (IF=5.81), co-author
- 16 Ionic liquid based $\text{Cu}_2\text{S}@C$ catalyst for effective coupling of diaryl diselenide with aryl halides under ligand-free conditions, Avinash A. Chaugule, Atul A. Pawar, Ashif H. Tamboli, **Harshad Bandal**, Wook-Jin Chung, Hern Kim, *Chem. Eng. J.* **351** (2018) 490–497 (IF= 13.27), co-author
- 17 Solvent free synthesis of cyclic ureas and urethanes by carbonylation method in the basic dicationic ionic liquid catalysts, Ashif H. Tamboli, **Harshad A. Bandal**, Hern Kim, *Chem. Eng. J.* **306** (2016) 826–831 (IF=13.27), co-author
- 18 NiCo_2O_4 hollow sphere as an efficient catalyst for hydrogen generation by NaBH_4 hydrolysis, Amol R. Jadhav, **Harshad A. Bandal**, Hern Kim, *Materials Letters* **198** (2017) 50–53 (IF=3.42), co-author

Book Chapter

- 1 K. K. Reddy, K. Y. Goud, M. Satyanarayana, S. Kummari, V. S. Kumar, **H. Bandal**, T. Jayaramudu, R. D. Pyarasani, H. Kim, J. Amalraj and K. Vengatajalabathy Gobi, Metal oxides in nanocomposite based electrochemical sensors for toxic chemicals, Metal oxide-metal nanocomposite-modified electrochemical sensors for toxic chemicals, editor A. Pandikumar P. Rameshkumar, Elsevier, ISBN: 978-0-12-820727-7

Poster/Oral presentation

- 1 H.A. Bandal, A.R. Jadhav, H. Kim; Cobalt impregnated magnetite multiwalled Carbon nanotubes nanocomposite as magnetically separable efficient catalyst for hydrogen generation by NaBH_4 hydrolysis. Poster presented in the Korean Society of Industrial and Engineering Chemistry (April 2015), South Korea.
- 2 H.A. Bandal, A.R. Jadhav, H. Kim; Ni-Cu nanoparticles supported reduced graphene oxide sheets as a novel catalyst for electrochemical water splitting. Poster presented in the Korean Society of Industrial and Engineering Chemistry (November 2015), South Korea
- 3 H.A. Bandal, A.R. Jadhav, H. Kim; Synthesis of Fe_2O_3 nanobeads decorated carbon nanotubes for high performance electrocatalytic water oxidation. Poster presented in 3rd NANOSMAT (May 2016), USA
- 4 H.A. Bandal, A.R. Jadhav, H. Kim; Growth of flower-like nickel oxide on nickel foam for efficient supercapacitor electrode. Poster presented in the International Symposium on Catalytic Conversion of Energy and Resources, (July 2016), South Korea
- 5 H.A. Bandal, A.R. Jadhav, H. Kim; A highly sensitive hydrazine electrochemical sensor based on $\text{Fe}_2\text{O}_3/\text{CNT}$ composite. Paper presented in the international conference on Geoscience, energy and materials (April 2017), Malaysia (Best Paper Award)
- 6 H.A. Bandal, H. Kim; Facile synthesis of foam-like Ni_3Fe @carbon with enhanced catalytic activity for oxygen evolution reaction. Paper presented in the International Environmental Engineering Conference, (November 2017), South Korea
- 7 H.A. Bandal, H. Kim, One Step Synthesis of Three-Dimensional Fe, Zn, N-Doped Carbon Foam and Their Application for Water Oxidation Reaction, Korean Institute of Chemical Engineers (October 2020), e-conference
- 8 H.A. Bandal, H. Kim, Fe- Fe_3C heterostructure embedded in carbon as a robust electrocatalyst for oxygen evolution reaction, Korean Institute of Chemical Engineers (May 2021), South Korea
- 9 H.A. Bandal, H. Kim, An electrochemical sensor based on Fe- Fe_3C /carbon for selective and sensitive detection of dopamine, Korean Institute of Chemical Engineers (May 2021), South Korea
- 10 H.A. Bandal, H. Kim, Improved hydrogen generation via a urea-assisted method over nickel foam decorated with Fe_3O_4 Polyhedron, European Materials Research Society, (May 2021) e-conference
- 11 H.A. Bandal, H. Kim, Zn-Cu/ poly (ionic liquid)/ CNT hybrids for efficient CO_2 electroreduction, The Polymer Society of Korea, (October 2021), South Korea