



Dr. Archana Kalekar

Assistant Professor, Department of Physics, Institute of Chemical Technology (ICT), Nathalal Parekh Marg, Matunga, Mumbai, Maharashtra, 400019, India

Date of Birth: 18th June 1985

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ACADEMIC AND RESEARCH EXPERIENCE

Institute of Chemical Technology (ICT), Mumbai, Maharashtra

Assistant Professor

June 2018 - Present

GMD Arts BW Commerce and Science College, Sinnar, Nashik, Maharashtra

Assistant Professor

May 2016 - May 2018

Chonnam National University, Gwangju, South Korea

Post-Doctoral Fellow (PDF)

August 2014 - May 2016

EDUCATION

- **Ph.D. in Physics (2014)**

Shivaji University, Kolhapur

PhD Thesis Title: "Studies on chemical synthesis of nanostructured Zinc Oxide thin films and their application in solar cell Supervisor: Prof. Pramod S Patil*

- **M.Sc. in Physics (2008)**

Shivaji University, Kolhapur

- **B.Sc. in Physics (2006)**

Shivaji University, Kolhapur

PROJECTS

1. ***ZnS passivated, earth-abundant Cu-Sn-S/Cu-Sb-S based nanocrystals sensitized TiO₂ nanotube arrays: a green and cost-effective photocatalyst for photoelectrochemical water splitting***

- *Principal Investigator*
- Sponsored by SERB, Govt. of India
- Project Duration: January 20, 2023 - Present
- Project Cost: INR 47 Lacs

2. Photo-electrocatalytic degradation of dye molecules: Effluent treatment

- Principal Investigator
- Sponsored by TEQIP-III
- Project Duration: March 1, 2019 - March 1, 2021
- Project Cost: INR 11 Lacs
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AWARDS

- **Best Presentation Award**
 - 7th India-Singapore Symposium on Condensed Matter Physics
 - Jointly awarded by IIT Bombay and NUS Singapore
- **Rajiv Gandhi Senior Research Fellowship (RGNF SRF)**
 - University Grants Commission (UGC)
 - March 1, 2019 - March 1, 2021
- **Rajiv Gandhi Junior Research Fellowship (RGNF JRF)**
 - University Grants Commission (UGC)

PAPER PUBLICATIONS

Author Name: Dr. Archana Kalekar (Alias Archana S Kamble)

(2024) *Extrinsic Pseudocapacitive NiSe/rGO/g-C₃N₄ Nanocomposite for High-Performance Hybrid Supercapacitors*

ACS Applied Materials & Interfaces, Volume 16, Issue 9, 2024, 11408-11420, ISSN 1944-8244

Somnath R Khaladkar, Oshnik Maurya, Girish Gund, Bhavesh Sinha, Deepak Dubal, Rajendra Deshmukh, **Archana Kalekar***

(2024) *NiFe₂O₄ nanoparticles as highly efficient catalyst for oxygen reduction reaction and energy storage in supercapacitor*

Materials Chemistry and Physics, Volume 316, 2024, 129072, ISSN 0254-0584

Authors: Nitish Kumar, Mohd Rehan Ansari, Somnath Khaladkar, Oshnik Maurya, Koteswara Rao Peta, **Archana Kalekar**, Monoj Kumar Singha, Jatis Kumar Dash

(2024) *In-situ growth of NiSe₂ nanoparticles on gC₃N₄ nanosheets for efficient hydrogen evolution reaction*

RSC Materials Advances, 2024

Authors: Somnath Khaladkar, Oshnik Maurya, Bhavesh Sinha, Girish Sambhaji Gund, Girish Kamble, Rajendra Deshmukh, Jin Hyeok Kim, **Archana Kalekar***

(2023) *Investigation of the Impact of Annealing Temperature on the Structural, Optical, and Magnetic Properties of Green-Synthesized ZFO Nanoparticles for Electrochemical Energy Storage Applications*

Journal of Energy Storage, Volume 74, Part B, 2023, 109494, ISSN 2352-152X

Authors: Mohd Rehan Ansari, Somnath Khaladkar, **Archana Kalekar**, Moon-Deock Kim, Koteswara Rao Peta

(2023) *Enhancing Charge Kinetics via In-Situ Growth of NiSe Nanoparticles on g-C₃N₄ Nanosheets for Efficient Hybrid Supercapacitors*

Journal of Energy Chemistry, Volume 87, 2023, Pages 304-313, ISSN 2095-4956

Authors: Somnath R Khaladkar, Oshnik Maurya, Girish Gund, Bhavesh Sinha, Deepak Dubal, RR Deshmukh*, **Archana Kalekar***

(2023) *Effective Transformation of Hydrothermally Grown TiO₂ Nanorods to Nanotube Arrays for Improved PEC Hydrogen Evolution*

Electrochimica Acta, Volume 471, 2023, 143391, ISSN 0013-4686

Authors: Oshnik Maurya, Somnath R Khaladkar, Bhavesh Sinha, Bhalchandra M Bhanage, RR Deshmukh, Jin Hyeok Kim*, **Archana Kalekar***

(2023) *Interface Engineering of Nickel Selenide and Graphene Nanocomposite for Hybrid Supercapacitor*

Adv. Energy Sustainability Res., 4: 2300013

Authors: Somnath Khaladkar, Girish Gund, Oshnik Maurya, Bhavesh Sinha, Paresch Salame, Deepak Dubal, Rajendra Deshmukh*, **Archana Kalekar***

(2022) *NO₂ Gas Sensing Properties of Chemically Grown Al-Doped ZnO Nanorods*

Sensors and Actuators A: Physical Volume - 340 Pages - 113546

Authors: VL Patil, DS Dalavi, SB Dhavale, NL Tarwal, SA Vanalakar, **AS Kalekar**, JH Kim, PS Patil

(2022) *Indium-Doped ZnO Nanorods for Chemiresistive NO₂ Gas Sensors*

New Journal of Chemistry Volume - 46 Pages -7588-7597

Authors: VL Patil, DS Dalavi, SB Dhavale, SA Vanalakar, NL Tarwal, **AS Kalekar**, JH Kim, PS Patil

(2021) *Emergence of Ni-Based Chalcogenides (S and Se) for Clean Energy Conversion and Storage*

Small Volume - 17 Pages - 2100361

Authors: Oshnik Maurya, Somnath Khaladkar, Michael R Horn, Bhavesh Sinha, Rajendra Deshmukh, Hongxia Wang, TaeYoung Kim, Deepak P Dubal, **Archana Kalekar**

(2021) *Rapid Synthesis of Ambient Pressure Dried Tetraethoxysilane-Based Silica Aerogels*

Journal of Sol-Gel Science and Technology Volume -97 Pages -5-10

Authors: VV Ganbavle, **AS Kalekar**, NS Harale, SS Patil, SL Dhere

(2020) *Book Chapter - Versatile 1-D Nanostructures for Green Energy Conversion and Storage Devices*

Book - Nanotechnology for Energy and Environmental Engineering Pages - 329-354

Authors: RR Deshmukh, **AS Kalekar**, SR Khaladkar, OC Maurya

(2019) *Hydrothermal Synthesis of Nanoporous Lead Selenide Thin Films: Photoelectrochemical and Resistive Switching Memory Applications*

Journal of Materials Science: Materials in Electronics Volume -30 Pages -17725-17734

Authors: Tejasvinee S Bhat, **Archana S Kalekar**, Dhanaji S Dalavi, Chetan C Revadekar, Atul C Khot, Tukaram D Dongale, Pramod S Patil

(2019) *Fractal Granular BiVO₄ Microspheres as High-Performance Anode Material for Li-Ion Battery*

Materials Letters Volume-252 Pages - 235-238

Authors: Deepak R Patil, Sagar D Jadhav, Aishwarya Mungale, **Archana S Kalekar**, Deepak P Dubal

(2019) *Chemically Synthesized Hierarchical Flower-Like ZnO Microstructures*

Zeitschrift für Physikalische Chemie Volume - 233 Pages -1183-1200

Authors: VL Patil, SA Vanalakar, SA Vhanalakar, **AS Kamble**, TD Dongale, DN Kurhe, PP Kamble, SP Patil, SS Shendage, PS Patil, JH Kim

(2018) *Fabrication of $\text{Cu}_2(\text{Zn}_x\text{Mg}_{1-x})\text{SnS}_4$ Thin Films by Pulsed Laser Deposition Technique for Solar Cell Applications*

Materials Science in Semiconductor Processing Volume - 76 Pages - 50-54

Authors: GL Agawane, SA Vanalakar, **AS Kamble**, AV Moholkar, JH Kim

(2019) *Fabrication of Nanogranular TiO_2 Thin Films by SILAR Technique: Application for NO_2 Gas Sensor*

Journal Inorganic and Nano-Metal Chemistry Volume - 49 Pages - 191-197

Authors: Vithoba Laxman Patil, Sharadrao Anandarao Vanalakar, Sambhaji S Shendage, Sarita P Patil, **Archana S Kamble**, NL Tarwal, Kiran K Sharma, Jin Hyeok Kim, Pramod S Patil

(2017) *Green Hydrothermal Synthesis of Nanostructured $\text{Cu}_2\text{ZnSnSe}_4$ as Solar Cell Material and Study of Their Structural, Optical, and Morphological Properties*

Applied Physics A Volume -123 Pages - 1-7

Authors: SA Vanalakar, GL Agawane, **AS Kamble**, PS Patil, JH Kim

(2017) *Electrospinning: A Versatile Technique for Making 1D Growth of Nanostructured Nanofibers and Its Applications: An Experimental Approach*

Applied Surface Science Volume - 423 Pages -641-674

Authors: Jyoti V Patil, Name Sawanta S Mali, **Archana S Kamble**, Chang K Hong, Jin H Kim, Pramod S Patil

(2017) *Influence of Surfactants on Electrochemical Growth of CdSe Nanostructures and Their Photoelectrochemical Performance*

Journal of Solid State Electrochemistry Volume - 21 Pages - 2649-2653

Authors: **AS Kamble**, VL Patil, BB Sinha, SA Vanalakar, SL Dhere, SS Kale, PS Patil, JH Kim

(2017) *Improving the Solar Cell Performance of Electrodeposited $\text{Cu}_2\text{ZnSn}(\text{S}, \text{Se})_4$ by Varying the $\text{Cu}/(\text{Zn}+\text{Sn})$ Ratio*

Solar Energy Volume -145 Pages 13-19

Authors: Yoon Jin Kim, Eun Jin Jo, **Archana S Kamble**, Myeng Gil Gang, Jun Ho Kim, Jong Ha Moon, Jin Hyeok Kim

(2016) *Influence of Laser Repetition Rate on the $\text{Cu}_2\text{ZnSn}(\text{SSe})_4$ Thin Films Synthesized via Pulsed Laser Deposition Technique*

Solar Energy Materials and Solar Cells Volume -157 Pages- 331-336

Authors: Sharadrao A. Vanalakar, Sawanta S. Mali, Ganesh L. Agwane, **Archana Kamble**, In Y. Kim, Pramod S. Patil, Jin Y. Kim, Jin Y. Kim

(2016) *Hydrothermally Grown ZnO Nanorods Arrays for Selective NO_2 Gas Sensing: Effect of Anion Generating Agents*

Ceramics International Volume - 42 Pages -12807-12814

Authors: NS Harale, **AS Kamble**, NL Tarwal, IS Mulla, VK Rao, JH Kim, PS Patil

(2016) *Studies on Effect of Temperature on Synthesis of Hierarchical TiO₂ Nanostructures by Surfactant-Free Single-Step Hydrothermal Route and Its Photoelectrochemical Characterizations*

Journal of Colloid and Interface Science Volume - 470 Pages -108-116

Authors: VV Burungale, VV Satale, AJ More, KKK Sharma, **AS Kamble**, JH Kim, PS Patil

(2015) *Fabrication of 3.01% Power Conversion Efficient High-Quality CZTS Thin Film Solar Cells by a Green and Simple Sol–Gel Technique*

Materials Letters Volume 158 Pages 58-61

Authors: GL Agawane, **AS Kamble**, SA Vanalakar, SW Shin, MG Gang, Jae Ho Yun, Jihye Gwak, AV Moholkar, Jin Hyeok Kim

(2016) *Surfactant-Free Single Step Synthesis of TiO₂ 3-D Microflowers by Hydrothermal Route and Its Photoelectrochemical Characterizations*

Journal of Colloid and Interface Science Volume - 470 Pages -108-116

Authors: Vishal V Burungale, Vinayak Vitthal Satale, AM Teli, **AS Kamble**, JH Kim, PS Patil

(2016) *Farming of Maize-Like Zinc Oxide via a Modified SILAR Technique as a Selective and Sensitive Nitrogen Dioxide Gas Sensor*

RSC Advances Volume - 6 Pages -90916-90922

Authors: VL Patil, SA Vanalakar, **AS Kamble**, SS Shendage, JH Kim, PS Patil

(2016) *Sulfur Ion Concentration Dependent Morphological Evolution of CdS Thin Films and Its Subsequent Effect on Photoelectrochemical Performance*

Physical Chemistry Chemical Physics Volume - 18 Pages - 28024-28032

Authors: **Archana Kamble**, Bhavesh Sinha, Ganesh Agawane, Sharad Vanalakar, In Young Kim, Jin Young Kim, Sampat S Kale, Pramod Patil, Jin Hyeok Kim

(2016) *Monodispersed Wurtzite Cu₂SnS₃ Nanocrystals by Phosphine and Oleylamine Free Facile Heat-Up Technique*

CrystEngComm Volume - 18 Pages - 2885-2893

Authors: **Archana Kamble**, Bhavesh Sinha, Sharad Vanalakar, Ganesh Agawane, Myeng Gil Gang, Jin Young Kim, Pramod Patil, Jin Hyeok Kim

(2015) *Effect of Heavy Metals on the Carbon and Nitrogen Ratio in Avicennia Marina from Polluted and Unpolluted Regions*

Marine Pollution Bulletin Volume- 101 Pages - 359-365

Authors: Ajay Yadav, Anirudh Ram, Divya Majithiya, Shailesh Salvi, Swati Sonavane, **Archana Kamble**, Suman Ghadigaonkar, Jiyalal Ram M Jaiswar, SN Gajbhiye

(2015) *3-D Cu₂ZnSn (S_xSe_{1-x})₄ (CZTSSe) Thin Film Solar Cells by Photoresist Pattern Assisted Method*
Renewable Energy

Authors: Eunjin Jo, Myeng Gil Gang, Yoon Jin Kim, Kyeeun Kim, **Archana S Kamble**, Jin Hyeok Kim

(2015) *Fabrication of Cu₂SnS₃ Thin Film Solar Cells Using Pulsed Laser Deposition Technique*

Solar Energy Materials and Solar Cells Volume 138 Pages 1-8

Authors: SA Vanalakar, GL Agawane, **AS Kamble**, CW Hong, PS Patil, JH Kim

(2015) *Boosting the Performance of ZnO/CdS Core-Shell Nanorod Array-Based Solar Cells by ZnS Surface Treatment*

Israel Journal of Chemistry

Authors: **Archana Kamble**, Bhavesh B Sinha, Kookchae Chung, Sawanta S Mali, Ganesh L Agawane, Sharad A Vanalakar,

In Young Kim, CK Hong, JY Kim, Jin Hyeok Kim, Pramod S Patil

(2015) *Facile Linker-Free Growth of CdS Nanoshell on 1-D ZnO: Solar Cell Application*

Electronic Materials Letters Volume 11 Pages 171-179

Authors: **Archana Kamble**, Bhavesh Sinha, Kookchae Chung, Anup More, Sharad Vanalakar, Chang Woo Hong, Jin Hyeok Kim, Pramod Patil

(2014) *Effect of Hydroxide Anion Generating Agents on Growth and Properties of ZnO Nanorod Arrays*

Electrochimica Acta Volume 149 Pages 386-393

Authors: **Archana S Kamble**, Bhavesh B Sinha, Kookchae Chung, Myeng G Gil, Vishal Burungale, Chan-Jin Park, Jin H Kim, Pramod S Patil

(2014) *Photoluminescence Quenching of a CdS Nanoparticles/ZnO Nanorods Core-Shell Heterogeneous Film and Its Improved Photovoltaic Performance*

Optical Materials Volume 37 Pages 766-772

Authors: SA Vanalakar, SS Mali, MP Suryawanshi, NL Tarwal, PR Jadhav, GL Agawane, KV Gurav, **AS Kamble**, SW Shin, AV Moholkar, JY Kim, JH Kim, PS Patil

(2014) *Photoelectrochemically Active Surfactant-Free Single Step Hydrothermal Mediated Titanium Dioxide Nanorods*

Journal of Materials Science: Materials in Electronics Volume 25 Pages 4501-4511

Authors: TS Bhat, RS Devan, SS Mali, **AS Kamble**, SA Pawar, IY Kim, YR Ma, CK Hong, JH Kim, PS Patil

(2013) *Plasma arc synthesis of nano-boron towards the synthesis of MgB₂ superconductors*

Journal of Superconductivity and Novel Magnetism, Volume 26, Pages 1503-1506.

Authors: BB Sinha, KC Chung, DS Kim, YS Cho, SH Jang, **AS Kamble**

(2013) *Silver incorporated polypyrrole/polyacrylic acid electrode for electrochemical supercapacitor*

AIP Conference Proceedings, Volume 1536, Pages 1181-1182.

Authors: Dipali S Patil, Sachin A Pawar, **Archana S Kamble**, Pramod S Patil

(2013) *Investigations on chemosynthesized CdSe microclusters*

AIP Conference Proceedings, Volume 1512, Pages 414-415.

Sachin A Pawar, SB Pawar, **AS Kamble**, DS Patil, PN Bhosale, PS Patil

(2012) *CdO and CdO-ZnO composite nanowires: synthesis, characterization and ethanol gas response*
Conference 2012 1st International Symposium on Physics and Technology of Sensors (ISPTS-1), Pages 286-289.
AS Kamble, NS Harale, PS Patil, BB Sinha, KC Chung

(2011) *From nanowires to cubes of CdO: Ethanol gas response.*
Journal of Alloys and Compounds, Volume 509, Pages 1035-1039.
AS Kamble, RC Pawar, JY Patil, SS Suryavanshi, PS Patil

(2011) *Photoluminescence and photoelectrochemical properties of nanocrystalline ZnO thin films synthesized by spray pyrolysis technique*
Applied Surface Science, Volume 257, Pages 10789-10794.
NL Tarwal, VV Shinde, **AS Kamble**, PR Jadhav, DS Patil, VB Patil, PS Patil

(2011) *Ethanol sensing properties of chemosynthesized CdO nanowires and nanowalls*
Materials Letters, Volume 65, Pages 1488-1491.
AS Kamble, RC Pawar, NL Tarwal, LD More, PS Patil

CONFERENCES AND POSTER PRESENTED

1. International Conference on Advanced Materials Development and Performance held at SPPU Pune on 11-15th July 2017
“*Facile synthesis of Cu₂SnS₃ monodispersed nanoparticles: a step towards green synthesis*” A.S.Kamble, B. B. Sinha, J. H. Kim, P.S,Patil
2. Research work presentation in International Conference on Advanced Rechargeable Batteries and allied materials held at CMET Pune on 8-10th March 2017
“*CuO nanourchins for photocatalytic application*”
A.S.Kamble, B. B. Sinha, J. H. Kim, P.S,Patil
3. National conference on Innovative Research in Chemical Sciences held at Shivaji University Kolhapur, 1-2nd Feb 2017
“*CuO nanourchins for photocatalytic application*”
A.S.Kamble, B. B. Sinha, J. H. Kim, P.S,Patil
4. 2nd International conference on physics of materials and material-based device fabrication, Jan. 13-15, 2014
“*Effect of ZnS surface treatment on solar cell performance of ZnO/ CdS core-shell nanorod array photoelectrode*”
A.S.Kamble, B. B. Sinha, S.A. Pawar, V V Burungle, T. S. Bhat, K. C. Chung, J. H. Kim, P.S,Patil*
5. 25th Annual General Meeting of Materials Research Society of India, Feb. 12-14, 2014
“*ZnO/CdS core-shell nanorod arrays based semiconductor sensitized solar cell: boosting of performance by ZnS surface treatment*”
A.S.Kamble, B. B. Sinha, T. S. Bhat, V. V. shinde, K. C. Chung, J. H. Kim, P.S,Patil*
6. International Conference of Young Researchers on Advanced Materials Singapore, July 1-6, IUMRS-ICYRAM 2012

Quantum Dot Sensitized Solar Cell Based on Surface Treated and Co-sensitized (CdS/CdSe) ZnO Nanorods
A.S.Kamble, S.A. Pawar, B. B. Sinha, K. C. Chung, P.S,Patil*

7. First international symposium on physics and technology of sensors, March 8-10, 2012
CdO and CdO-ZnO composite nanowires: synthesis, characterization, and ethanol gas response
A.S.Kamble, N.S. Harale, B. B. Sinha, K. C. Chung, P.S,Patil*
8. Advances in synthetic methodologies and new materials, Dept. of Chemistry, Shivaji University, Kolhapur, Jan. 21-22, 2011
Ethanol sensing properties of chemosynthesized CdO nanowires and nanowalls
A.S. Kamble, R.C. Pawar, L.D. More, P.S. Patil*
9. RTNCER at Vivekanand College, Kolhapur, Dec. 15-16, 2010
Synthesis of 1-D nanostructures of ZnO and CdO for gas sensor applications
R.C. Pawar, A.S. Kamble, M. L. Karanjakar, P.M. Kadam and P.S. Patil*
10. 21st AGM of MRSI: Advanced Ceramic Materials: monoliths to composites at Sardar Patel University, Vallabh Vidyanagar, Gujarat, Feb. 9-11, 2010
Synthesis of CdO nanowires and nanowalls by facile chemical bath deposition at room temperature
S. Kamble, R. C. Pawar, Dr. P.S. Patil*
11. International Conference on Advanced Materials and Applications, Shivaji University, Kolhapur, Nov.15-17, 2007
Synthesis and characterization of cobalt catalyzed carbon nanotubes using chemical vapor deposition technique
S. Kamble, U. B. Suryavanshi, C. H. Bhosale*

ORAL PRESENTATIONS AND INVITED TALKS

1. Invited Talk on “Introduction to thin film solar cells” organized by KBP college Islampur, 1st March 2024
2. Invited Talk on “Solar Energy conversion, Fundamentals and future perspectives of photovoltaics” organized by KBP college Vashi and Navi Mumbai Science Foundation Vashi (9th January 2024)
3. Resource person Invited Talk on “Green hydrogen: Introduction to water electrolysis” at state level workshop and Hands-On training on Nanomaterials synthesis and electrochemical measurement techniques” organized by Mahatma Phule, ASC college Panvel, Mumbai 19th December 2023
4. Invited Talk on “Nanomaterials for solar cell applications” organized by Institute of Science Mumbai for National Seminar on Advanced Materials 2020 (A Special Contribution : Women Scientist)" [NSAM - 2020] during 3rd and 4th March 2020.
5. Invited Talk on “*Versatile nanomaterials for Energy harvesting and storage.*”Recent Advances in Material Science and Technology RAMST 2019 organized by Government Engineering college, Keonjhar and Institute of Chemical Technology Mumbai, 30-31st March 2019
6. Oral Presentation on “*Boosting the performance of ZnO/CdS core/shell nanorod arraybased semiconductor sensitized solar cell by ZnS surface treatment.*”
Global photovoltaics conference, 10-11 Nov. 2015 Bexco, Busan South Korea
A. S. Kamble, B. B. Sinha, K. C. Chung, J. H. Kim, P.S,Patil

7. Oral Presentation on “*Cu-Sn-S colloidal nanocrystals by thermolysis: size-dependent structural, compositional and optical study*”
Korea Photovoltaics Society conference, 28-30 Apr. 2015 Puan, South Korea.
A. S. Kamble, B. B. Sinha, K. C. Chung, J. H. Kim, P.S. Patil