Publications

Book Chapter:

Sahoo, R.; Pal, A. and Pal, T. (2018) Noble Metal-Transition Metal Oxides/Hydroxides: Desired Materials for Pseudocapacitor. In Noble Metal-Metal Oxide Hybrid Nanoparticles: Fundamentals and Applications. ISBN: 978-0-12-814135-9 (Chapter in Press). ELSEVIER.

Journals:

Post-Doc. (2017-):

1. **Sahoo, R.;** Pham, D. T.; Lee T. H.; Seok J.; Luu T. H. and Lee, Y. H. Redox-Driven Route for Widening Voltage Window in Asymmetric Supercapacitor. *ACS Nano* 2018, *12*, 8494-8505.

2. Lee T. H.; Pham, D. T.; **Sahoo, R.;** Seok J.; Luu T. H. and Lee, Y. H. High Energy Density and Enhanced Stability of Asymmetric Supercapacitors with Mesoporous MnO_2@CNT and Nanodot MoO_3@CNT Free-Standing Films. *Energy Storage Mater.* 2018, *12*, 223-231.

Ph.D. (2012-2016):

1. **Sahoo, R.;** Acharyya, P.; Sing, N. K.; Pal, A.; Negishi, Y. and Pal, T. Advance Aqueous Asymmetric Supercapacitor Based on Large 2D $NiCo_2O_4$ Nanostructures and the rGO@Fe_3O_4 Composite. *ACS Omega* 2017, *2*, 6576−6585.
2. **Sahoo, R.;** Pal, A. and Pal, T. Proportion of Composition in a Composite does Matter to Behave as an Advanced Supercapacitor. *J. Mater. Chem. A* 2016, 4, 17440-17454.
3. **Sahoo, R.;** Pal, A. and Pal, T. 2D Materials for Renewable Energy Storage Devices: Outlook and Challenges. *Chem. Commun.* 2016*, 52,* 13528-13542.
4. **Sahoo, R.;** Sasmal, A. K.; Ray, C.; Dutta, S.; Pal, A. and Pal, T. Suitable Morphology Makes $CoSn(OH)_6$ Nanostructure a Superior Electrochemical Pseudocapacitor. *ACS Appl. Mater. Interfaces* 2016, *8*, 17987-17998.
5. **Sahoo, R.;** Santra, S.; Ray, C.; Pal, A.; Negishi, Y.; Ray, S. K. and Pal, T. Hierarchical Growth of $ZnFe_2O_4$ for Sensing Applications. *New J. Chem.* 2016, *40*, 1861-1871.
6. **Sahoo, R.;** Roy, A.; Dutta, S.; Ray, C.; Aditya, T.; Pal, A. and Pal, T. Liquor Ammonia Mediated V(V) Insertion in Thin Co_3O_4 Sheets for Improved Pseudocapacitors with High Energy Density and High Specific Capacitance Value. *Chem. Commun.* 2015, 51, 15986-15989.
7. **Sahoo, R.;** Pradhan, M.; Roy, A.; Dutta, S.; Ray, C.; Negishi, Y.; Pal, A and Pal, T. Redox-Mediated Synthesis of a Fe_3O_4–MnO_2 Nanocomposite for Dye Adsorption and Pseudocapacitance. *Chem. Asian J.* 2015, *10*, 1571-1580.
8. **Sahoo, R;** Dutta, S.; Pradhan, M.; Ray, C.; Roy, A. Pal, T and Pal. A. Arsenate Stabilized Cu_2O Nanoparticle Catalyst for One-Electron Transfer Reversible Reaction. *Dalton trans.* 2014, *43*, 6677-6683

9. **Sahoo, R.;** Roy, A.; Ray, C.; Mondal, C.; Negishi, Y.; Yusuf, S. M.; Pal, A. and Pal, T. Decoration of Fe_3O_4 Base Material with Pd Loaded CdS Nanoparticle for Superior Photocatalytic Efficiency. *J. Phys. Chem. C* 2014, *118*, 11485-11494.
10. Roy, A.; **Sahoo, R.;** Ray, C.; Dutta, D. and Pal, T. Soft Template Induced Phase Selective Synthesis of Fe_2O_3 Nanomagnets: One Step towards Peroxidase-mimic Activity Allowing Colorimetric Sensing of Thioglycolic Acid. *RSC. Adv.* 2016, *6*, 32308-32318.
11. Dutta, S.; **Sahoo, R**.; Ray, C.; Sarkar, S.; Jana, J.; Negishi, Y. and Pal, T. Biomolecule-Mediated CdS-TiO_2-Reduced Graphene Oxide Ternary Nanocomposites for Efficient Visible Light-Driven Photocatalysis. *Dalton trans.* 2015, *44*, 193-201.
12. Roy, A.; **Sahoo, R.;** Chowdhury, J.; Bhattacharya, T. S.; Agarwal, R. and Pal, T. Directional Growth of Ag Nanorod from Polymeric Silver Cyanide: A Potential Substrate for Concentration Dependent SERS Signal Enhancement Leading to Melamine Detection. *Spectrochim. Acta Mol. Biomol. Spectrosc.* 2017, 183, 402-407.
13. Aditya, T.; Jana, J.; **Sahoo, R.;** Roy, A.; Pal, A. and Pal, T. Silver Molybdates with Intriguing Morphology and Peroxidase Mimic with High Sulfide Sensing Capacity. *Cryst. Growth Des.* 2017, *17*, 295-307.
14. Roy, A.; Debnath, B.; **Sahoo, R.;** Pal, T. Micelle Confined Mechanistic Pathway for 4-Nitrophenol Reduction. *J. Colloid. Interface Sci.* 2017, *493*, 288-294.
15. Sasmal, A. K.; Pal, J.; **Sahoo, R.;** Kartikeya, P.; Dutta, S. and Pal, T. Superb Dye Adsorption and Dye-Sensitized Change in Cu_2O−Ag Crystal Faces in the Dark. *J. Phys. Chem. C* 2016*, 120,* 21580-21588.
16. Roy, A.; Debnath, B.; **Sahoo, R.;** Chandrakumar, K. S.; Ray, C.; Jana, J. and Pal, T. Enhanced Catalytic Activity of Ag/Rh Bimetallic Nanomaterial: Evidence of an Ensemble Effect. *J. Phys. Chem. C* 2016, *120*, 5457-5467.
17. Ray, C.; Dutta, S.; **Sahoo, R.;** Roy, A.; Negishi, Y. and Pal, T. Fabrication of Nitrogen-Doped Mesoporous-Carbon-Coated Palladium Nanoparticles: An Intriguing Electrocatalyst for Methanol and Formic Acid Oxidation. *Chem. Asian J.* 2016, *11,* 1588-1596.
18. Mondal, C.; Singh, A.; **Sahoo, R.;** Sasmal, A. K.; Negishi, Y. and Pal, T. Preformed ZnS Nanoflower Prompted Evolution of CuS/ZnS p–n Heterojunctions for Exceptional Visible-Light Driven Photocatalytic Activity. *New J. Chem.* 2015, *39*, 5628-5635.
19. Dutta, S.; Ray, C.; Roy, A.; **Sahoo, R.** and Pal, T. Metal Bromide Controlled Interfacial Aromatization Reaction for Shape-Selective Synthesis of Palladium Nanostructures with Efficient Catalytic Performances. *Chem. Eur. J.* 2016, *22*, 10017-10027.
20. Ray, C.; Dutta, S.; Roy, A.; **Sahoo, R.** and Pal, T. Redox Mediated Synthesis of Hierarchical Bi_2O_3/MnO_2 Nanoflowers: a Non-Enzymatic Hydrogen Peroxide Electrochemical Sensor. *Dalton trans.* 2016, *45*, 4780-4790.
21. Pradhan, M.; Roy, A.; Sinha, A. K.; **Sahoo, R.;** Deb, D. and Pal, T. Solid-state Transformation of Single Precursor Vanadium Complex Nanostructures to V_2O_5 and VO_2: Catalytic Activity of V_2O_5 for Oxidative Coupling of 2-Naphthol. *Dalton trans.* 2015, *44*, 1889-1899.
22. Roy, A.; Pradhan, M.; Ray, C.; **Sahoo, R.;** Dutta, S. and Pal, T. Facile Synthesis of Pyridine Intercalated Ultra-long V_2O_5 Nanowire from Commercial V_2O_5: Catalytic Applications in Selective Dye Degradation. *CrystEngComm* 2014, *16*, 7738-7744.
23. Pal, A.; Saha, S.; Maji, S. K.; **Sahoo, R.;** Kundu, M. and Kundu, A. Galvanic Replacement of As(0) Nanoparticles by Au(III) for Nanogold Fabrication and SERS Application. *New J. Chem.* 2014, *38*, 1675-1683.

24. Ray, C.; Dutta, S.; Sarkar, S.; **Sahoo, R.;** Roy, A. and Pal, T. Intrinsic Peroxidase-like Activity of Mesoporous Nickel Oxide for Selective Cysteine Sensing. *J. Mater. Chem. B* 2014, 2, 6097-6105.

25. Mondal, C.; Ganguly, M.; Pal, J.; **Sahoo, R.;** Sinha, A. K. and Pal, T. Pure Inorganic Gel: a New Host with Tremendous Sorption Capability. *Chem. Commun.* 2013, *49*, 9428-9430.

26. Ray, C., Dutta, S.; Sarkar, S.; **Sahoo, R.;** Roy, A. and Pal, T. A Facile Synthesis of 1D Nano Structured Selenium and Au Decorated Nano Selenium: Catalysts for the Clock Reaction. *RSC Adv.* 2013, *3*, 24313-24320.

27. Dutta, S.; Ray, C.; Sarkar, S.; Roy, A., **Sahoo, R.** and Pal, T. Facile Synthesis of Bimetallic Au-Pt, Pd-Pt, and Au-Pd Nanostructures: Enhanced Catalytic Performance of Pd-Pt Analogue towards Fuel Cell Application and Electrochemical Sensing. *Electrochimica Acta* 2015, *180*, 1075-1084.

28. Ray, C., Sarkar, S.; Dutta, S.; Roy, A.; **Sahoo, R.;** Negishi, Y. and Pal, T. Evolution of Tubular Copper Sulfide Nanostructures from Copper(I)–Metal Organic Precursor: a Superior Platform for the Removal of Hg(II) and Pb(II) Ions. *RSC Adv.* 2015, *5*, 12446-12453.

29. Dutta, S.; Ray, C.; Mallick, S.; Sarkar, S.; **Sahoo, R.;** Negishi, Y. and Pal, T. A Gel-Based Approach To Design Hierarchical CuS Decorated Reduced Graphene Oxide Nanosheets for Enhanced Peroxidase-like Activity Leading to Colorimetric Detection of Dopamine. *J. Phys. Chem. C* 2015*, 119*, 23790-23800.

30. Dutta, S.; Sarkar, S.; Ray, C.; Roy, A. **Sahoo, R.** Pal, T. A Novel Approach for the in Situ Synthesis of Pt–Pd Nanoalloys Supported on Fe_3O_4@C Core–Shell Nanoparticles with Enhanced Catalytic Activity for Reduction Reactions. *ACS appl. Mater.& interfaces* 2014, 6, 9134-9143.

31. Mondal, C.; Ganguly, M.; Sinha, A.K.; Pal, J.; **Sahoo, R.** and Pal, T. Robust Cubooctahedron $Zn_3V_2O_8$ in Gram Quantity: a Material for Photocatalytic Dye Degradation in Water. *CrystEngComm* 2013, 15, 6745-6751

List of Three Selected Major Publications

1. **Sahoo, R.;** Roy, A.; Dutta, S.; Ray, C.; Aditya, T.; Pal, A. and Pal, T. Liquor Ammonia Mediated V(V) Insertion in Thin Co_3O_4 Sheets for Improved Pseudocapacitors with High Energy Density and High Specific Capacitance Value. *Chem. Commun.* 2015, 51, 15986-15989. **(I.F. 6.290)**

My surge in obtaining morphology driven mixed metal oxide becomes eventful. Here we have demonstrated the electrochemical activity of a mixed metal oxide ($Co_3V_2O_8$ nanosheet) which happens to be superior to the corresponding skeletal single metal oxide (Co_3O_4 nanosheet). It has been discovered that ammonia plays a promising role for the evolution of 2 D nanosheets both for Co_3O_4 and $Co_3V_2O_8$. Experimental results illustrate the excellent pseudocapacitance activities for both the samples due to their ultrathin 2 D morphology which we anticipated. On the basis of comparative studies, we have concluded that due to the mixed oxide backbone of $Co_3V_2O_8$ nanosheet extraordinary pseudocapacitor electrode material in aqueous electrolyte emerges out. I have presented this work in an International Conference (NANO 15) held at Tiruchigide, India, in December 2015.

2. **<u>Sahoo, R.</u>;** Sasmal, A. K.; Ray, C.; Dutta, S.; Pal, A. and Pal, T. Suitable Morphology Makes $CoSn(OH)_6$ Nanostructure a Superior Electrochemical Pseudocapacitor. *ACS Appl. Mater. Interfaces* 2016, *8*, 17987-17998. **(I.F. 8.097)**

Here my continuous effort for obtaining pseudocapacitive material becomes a reality. We have demonstrated the importance of morphology driven pseudocapacitive activity in electrochemistry. In that respect, $CoSn(OH)_6$ bearing two different morphologies, 2 D nonosheets assembled hierarchical nanostructure (HNS) and cubic nanostructure (CNS) have been synthesized. Here also ammonia plays a vital role in the synthesis. Judicious exploitation of ammonia and after that concentrated NaOH successively presented HNS (sheet assembled structure) and CNS samples, respectively. Upon analyzing the experimental data it has been concluded that due to the ultrathin 2 D surface and high specific surface area, HNS sample serves as a better pseudocapacitor electrode over CNS.

3. **<u>Sahoo, R.</u>;** Pham, D. T.; Lee T. H.; Seok J.; Luu T. H. and Lee, Y. H. Redox-Driven Route for Widening Voltage Window in Asymmetric Supercapacitor. *ACS Nano* 2018, DOI: 10.1021/acsnano.8b04040. **(I.F. 13.709)**

Although aqueous asymmetric supercapacitors are promising technologies because of their high energy density and enhanced safety, their voltage window is still limited by the narrow stability window of water. Redox reactions at suitable electrodes near the water splitting potential can increase the working potential. Here, we demonstrate a kinetic approach for expanding the voltage window of aqueous asymmetric supercapacitors using *in situ* activated Mn_3O_4 and VO_2 electrodes. The underlying mechanism indicates a specific potential of ~1V *vs* Ag/AgCl for the oxidation of Mn^{4+}-to-Mn^{7+} at the positive electrode and ~-0.8 V *vs* Ag/AgCl for the reduction of V^{3+}-to-V^{2+} at the negative electrode, which limits oxygen and hydrogen evolution reactions, respectively. The as-fabricated aqueous asymmetric supercapacitor exhibited a working voltage of 2.2 V. The main advantage of this strategy is the introduction of certain metal ion (either by *in situ* or *ex situ* method) inside the electrode which exhibits redox activity near water splitting potential to suppress OER and HER. This is a promising finding to increase the working voltage of aqueous asymmetric supercapacitors in the future.

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