Dr. Syam Kandula
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Profile

Currently, I am working as a ***Korean Research Fellowship (KRF) Postdoctoral Researcher*** at ***Korea Institute of Science and Technology, Seoul*** in the group of ***Dr. Jeong Gon Son***. I am focusing on understanding of charge storage mechanism on various facet exposed heteronanostructured materials using *in-situ* techniques. I carried out my second ***postdoctoral research*** in the group of ***Prof. Allen J Bard*** at the Department of Chemistry, ***The University of Texas, Austin, Texas, USA,*** from September 2018 to March 2019. I carried out my first ***postdoctoral research*** in the group of ***Prof. Joong Hee Lee*** at the BIN Convergence Technology, ***Chonbuk National University, South Korea*** from March 2017 to Aug 2018. I have completed ***Ph.D.*** under the supervision of ***Prof. P. Jeevanandam*** at the Department of Chemistry, ***Indian Institute of Technology Roorkee, India,*** from Dec 2011 to July 2016. I have authored ***thirteen international publications*** and ***one book chapter***. I am also working as a ***reviewer*** for seven international journals.

Academic Chronicle

- ***Doctor of Philosophy,*** in Inorganic Nanomaterials Chemistry ***Dec 2011–July 2016***
  Thesis title: "Synthesis of core@shell nanoparticles and studies on their properties and applications".
  Supervisor: Prof. P. Jeevanandam
  Department of Chemistry, ***Indian Institute of Technology Roorkee,*** India.
- ***Master of Science,*** specialization in Analytical Chemistry ***July 2008–June 2010***
  Department of Chemistry, ***National Institute of Technology Warangal,*** India
  First Division ***(CGPA 9.1 out of 10)***
- ***Bachelor of Science*** (Mathematics, Physics, Chemistry) ***June 2005–March 2008***
  Acharya Nagarjuna University, Nagarjuna Nagar, India
  First Division ***(Percentage 85.9 %)***

Research Interests

- Synthesis of optically and electrochemically interesting ***1D, 2D and 3D metal oxide/sulfide/phosphide coupled with graphene-based or transition metal dichalcogenides (TMDs)*** based novel heterostructured nanomaterials by economical bottom-up and top-down approaches.
- Studies on their ***shape, size, and facet dependent physicochemical (optical, and electrochemical) properties***.
- The exploration of synthesized heterostructured nanomaterials for ***energy conversion and energy storage (Batteries and Supercapacitors) applications***.

Research/Professional Skills:

- A ***strong research record*** on the synthesis of various ***core@shell/yolk@shell*** heteronanostructures using ***bottom-up approach***.

- ***Hands on experience*** on many analytical instruments includes ***XRD, FE-SEM, HRTEM, XPS, Raman, TGA, FT-IR, UV-Vis DRS, PL, Zeta sizer, BET, and VSM***.
- Expertise over electrochemical work station and ***fabrication of asymmetric solid-state supercapacitor (ASC) device.***
- Good command on ***fabrication of ultramicroelectrodes and ultrananoelectrodes*** for ***scanning electrochemical microscopy (SECM)*** related experiments.
- Good ***writing skills*** for ***making manuscripts, book chapters, review articles and projects***.
- Hands on skills with many science related software includes ***Chem Bio-Draw Ultra 16.0, Origin Pro 2017, Corel Draw X7, Adobe Photoshop CS5, and MS Office 2016***.
- Acquired comprehensive knowledge in literature survey like ***Abstracting, Journal and Patents search*** both manually as well as electronically.

Research Experience

- ***Dr. Jeong Gon Son, Korea Institute of Science and Technology, Seoul,*** South Korea
  KRF Postdoctoral Research Fellow, Aug 2019 to till date
  I am working on the synthesis of various facet exposed heteronanostructured composites and understanding of charge storage aspects on each facet using *in-situ* analytical techniques. Later, various facets exposed heteronanostructured composites will be explored for flexible, transparent, and wearable energy storage devices.

- ***Prof. Bard Group, The University of Texas, Austin***, Texas, United States
  Postdoctoral Research Fellow, Sep 2018 to March 2019
  I worked on fabrication of various carbon fiber, platinum and gold ***ultramicroelectrodes and ultrananoelectrodes***. I have used these electrodes for the studying of various ***short-lived radical lifetimes and their kinetics***. By using the ***Scanning Electrochemical Microscopy (SECM)***, I have modulated the nanogap between the tip and substrate to collect short lived radicals on the substrate. These experiments provided more detailed study of radical lifetimes and their kinetics. In parallel, I have also learned many ***electrochemistry concepts*** under the guidance of ***Prof. Bard***.

- ***Prof. Lee Group, Chonbuk National University***, Jeonju, South Korea
  Postdoctoral Research Fellow, March 2017 to Aug 2018
  I carried out my first postdoctoral research on mixed metal oxide/sulfide/selenide and graphene and transition metal dichalcogenide (TMD) based ternary hetero structured core@shell nanomaterials for ***solid-state supercapacitors and electrocatalytic overall water splitting.*** I have been mainly focused on 1D materials for energy conversion and energy storage applications due to their high aspect ratio and short ion/electron diffusion length, for better catalytic and energy storage applications.

- ***Prof. Jeevanandam Group, Indian Institute of Technology, Roorkee,*** India
  Ph.D. Research Scholar, Dec 2011 to July 2016
  My research was focused on the synthesis of ***various shaped core@shell heteronanostructures*** and studies on their ***optical properties*** and exploration of their ***catalytic applications***. The aim of my research work is to control shape and size of the core@shell nanoparticles. I have synthesized various core@shell nanoparticles and nanorattles/yolk@shell nanoparticles by ***thermal decomposition, homogeneous precipitation, StÖber's process, and solution route***. The core@shell nanoparticles that have been investigated are (i) ***SiO_2@CdS*** (reverse type-I) and ***ZnO@CdS*** (type-II) core@shell nanoparticles, (ii) semiconductor-metal based core@shell nanoparticles (***ZnO@Ag*** and ***Cu_2O@Ag***), and (iii) nanorattle/yolk-shell type core-shell nanoparticles

(***SiO_2@Co_3O_4*** and ***SiO_2@Ni–Co mixed metal oxides***). The synthesized core@shell nanoparticles were characterized by an array of analytical techniques. The optical properties of core@shell nanoparticles were studied using UV-Visible diffuse reflectance spectroscopy (DRS) and photoluminescence spectroscopy (PL). The synthesized core@shell nanoparticles and nanorattles were explored as potential catalysts for ***photodegradation of methylene blue*** in aqueous solution under sunlight, ***reduction of 4-nitrophenol and methylene blue*** in aqueous solutions, ***artificial peroxidase mimics***, and ***adsorption of mixture of rhodamine B and methylene blue*** in aqueous solutions.

- ***Prof. Natarajan Group, Indian Institute of Science, Bangalore,*** India
  Summer Trainee, May 2010 to June 2010
  Project Title: "Synthesis and characterization of new ***metal organic open framework*** solids using hydrothermal method".

Teaching Experience

- Worked as a ***tutor*** for ***lab work*** for ***post graduate*** (Master of Science) and ***under graduate*** (Bachelor of Technology) courses conducted by ***Department of Chemistry, IIT Roorkee*** for ***three years*** (July 2012 to April 2015) during my Ph.D. Program.
- ***Worked as a lecturer*** (analytical chemistry) in the ***Department of Chemistry, SVRM PG College,*** Nagaram affiliated to ***Acharya Nagarjuna University, Nagarjuna Nagar*** during the period 1st August 2011 to 19th December 2011.

Journals Reviewing

- Carbon – Elsevier Publications
- Small – Wiley Publications
- Journal of Physics and Chemistry of Solids – Elsevier Publications
- Chemosphere – Elsevier Publications
- Separation and Purification Technology – Elsevier Publications
- Environmental Science and Pollution Research – Springer Publications
- Journal of Nanomaterials – Hindawi Publications

Scholastic Achievements

- A certificate of appreciation in Ishan Vikas program organized by the ***Ministry of Human Resource Development, Government of India***, June 11–19, 2015.
- 1st prize for oral presentation (Ideaz) in Cognizance, a technical festival held at ***Indian Institute of Technology, Roorkee*** March 27–29, 2015.
- 1st prize for oral presentation (Spectrum) in Cognizance, a technical festival held at ***Indian Institute of Technology, Roorkee*** March 27–29, 2015.
- Qualified Graduate Aptitude Test in Engineering (GATE), conducted by the ***Ministry of Human Resource Development, Government of India,*** 2010 and 2011.
- Qualified National Eligibility Test (NET), conducted by the ***Council of Scientific and Industrial Research, Government of India,*** December 2010 and June 2011.
- Secured highest marks in class during ***Master of Science, Bachelor of Science*** *and* ***Class XII***.

Book Chapters

1. **Nanomaterials for Electrochemical Energy Storage Devices**
   By: ***Syam Kandula***, Nam Hoon Kim, and Joong Hee Lee
   Published by: Wiley-Scrivener, Page number: 573-624, Year: 2019

List of Publications

1. ***Syam Kandula***, Khem Raj Shrestha, Gaddam Rajeshkhanna, Nam Hoon Kim, and Joong Hee Lee, "Kirkendall growth and Ostwald ripening induced hierarchical morphology of Ni-Co LDH/$MMoS_x$ (M = Co, Ni, and Zn) heteronanostructures as advanced electrode materials for asymmetric solid-state supercapacitors", ***ACS Applied Materials & Interfaces***, **(2019)**, 11, 11555−11567.
2. Khem Raj Shrestha, ***Syam Kandula***, Nam Hoon Kim, Joong Hee Lee, "A facile one–pot synthesis of 2D $MnCo_2O_4$ nanoflakes decorated on nitrogen–doped graphene for asymmetric supercapacitors" ***Journal of Alloys and Compounds***, **(2019)**, 771, 810**–**820**.**
3. Khem Raj Shrestha, ***Syam Kandula***, Gaddam Rajeshkhanna, Manish Srivastava, Nam Hoon Kim, and Joong Hee Lee, "3D hierarchical $MnCo_2O_4$@N-C@MnO_2 core@shell@shell nanowires as advanced electrode material for high performance all-solid-state supercapacitors", ***Journal of Materials Chemistry A*, (2018)**, 6, 24509–24522.
4. Gaddam Rajeshkhanna, ***Syam Kandula***, Khem Raj Shrestha, Nam Hoon Kim, and Joong Hee Lee, "A new class of $Zn_{1-x}Fe_x$-oxyselenide and $Zn_{1-x}Fe_x$-LDH nanostructured material with remarkable bifunctional oxygen and hydrogen evolution electrocatalytic activities for overall water splitting", ***Small***, **(2018)**, 14, 1803638.
5. ***Syam Kandula***, Khem Raj Shrestha, Nam Hoon Kim, and Joong Hee Lee, "Fabrication of a 3D hierarchical sandwich Co_9S_8/α–MnS@N–C@MoS_2 nanowire architectures as advanced electrode material for high performance hybrid supercapacitors", ***Small*, (2018)**, 14, 1800291.
6. Bhavani Prasad Nenavathu, ***Syam Kandula***, and Swati Verma, "Visible**–**light**–**driven photocatalytic degradation of safranin-T using functionalized graphene oxide nanosheets (FGS)/ZnO nanocomposites", ***RSC Advances*, (2018)**, 8, 19659**–**19667.
7. ***Syam Kandula*** and Pethaiyan Jeevanandam, "Synthesis of Cu_2O@Ag polyhedral core@shell nanoparticles by a novel thermal decomposition approach for catalytic applications", ***European Journal of Inorganic Chemistry***, **(2016)**, 2016, 1548**–**1557.
8. ***Syam Kandula*** and Pethaiyan Jeevanandam, "Sun-light-driven photocatalytic activity by ZnO/Ag heteronanostructures synthesized *via* a facile thermal decomposition approach", ***RSC Advances*, (2015)**, 5, 76150**–**76159.
9. ***Syam Kandula*** and Pethaiyan Jeevanandam, "Synthesis of silica@Ni**–**Co mixed metal oxide core@shell nanorattles and their potential use as effective adsorbents for waste water treatment", ***European Journal of Inorganic Chemistry*, (2015)**, 2015, 4260**–**4274.
10. ***Syam Kandula*** and Pethaiyan Jeevanandam, "A facile synthetic approach for SiO_2@Co_3O_4 core@shell nanorattles with enhanced peroxidase**–**like activity", ***RSC Advances*, (2015)**, 5, 5295**–**5306.
11. ***Syam Kandula*** and P. Jeevanandam, "Visible-light-induced photodegradation of methylene blue using ZnO/CdS heteronanostructures synthesized through a novel thermal decomposition approach", ***Journal of Nanoparticle Research*, (2014)**, 16, 2452/1**–**18.
12. ***Syam Kandula*** and P. Jeevanandam, "Synthesis of SiO_x@CdS core@shell nanoparticles by simple thermal decomposition approach and studies on their optical properties", ***Journal of Alloys and Compounds*, (2014)**, 615, 167**–**176.

13. Surendar Tonda, Santosh Kumar, ***Syam Kandula*** and Vishnu Shanker, "Fe-doped and-mediated graphitic carbon nitride nanosheets for enhanced photocatalytic performance under natural sunlight", ***Journal of Materials Chemistry A*, (2014)**, 2, 6772–6780.

Conferences/Workshops

- ***Syam Kandula***, participated in the ***CEC annual workshop 2019***, organized by The University of Texas, Austin, ***USA***, Feb 9–10, 2019.
- ***Syam Kandula*** et al., Oral presentation on "Synthesis of $MnCo_2S_4$@C@MoS_2 core@ shell heteronanostructures for supercapacitors" in the ***Spring conference 2018***, organized by Korea Hydrogen & New Energy Society, Incheon, ***South Korea***, May 2–4, 2018.
- ***Syam Kandula*** et al., Oral presentation on "Design of Co_3O_4@N–C heteronanostructures for supercapacitor applications" in the ***National conference 2017 Fall***, organized by The Korean Society for Composite Materials, Daejeon, ***South Korea***, November 23–24, 2017.
- ***Syam Kandula*** et al., Poster presentation on "Synthesis of $MnCo_2O_4$@N–C core@shell heteronanostructures for supercapacitor applications", ***26th International Conference*** on ***The Processing and Fabrication of the Advanced Materials*** organized by Chonbuk National University, Jeonju, ***South Korea***, October 16–21, 2017.
- ***Syam Kandula*** et al., Poster presentation on "$MnCo_2O_4$ decorated on N–doped graphene for supercapacitor applications", ***25th Annual International Conference*** on ***Composites/ Nano Engineering*** organized by University of Salerno, ***Italy***, July 16–22, 2017.
- ***Syam Kandula*** et al., Poster presentation on "Thermal decomposition approach for the synthesis of ZnO/Ag heteronanostructures and their use as photocatalyst for the degradation of methylene blue", ***4th International Conference*** on ***Frontiers in Nanoscience and Technology*** organized by Cochin University of Science and Technology, Cochin, ***India***, February 20–23, 2016.
- ***Syam Kandula***, Participated in the **"*Workshop on SciFinder*"** and **"*Workshop on Scopus, Mendeley and Reaxys"*** organized by ***IIT Roorkee, India***, in March 2015.
- ***Syam Kandula*** et al., Poster presentation on "ZnO@CdS core@shell heteronanostructures as photocatalyst for the degradation of methylene blue", ***17th Chemical Research Society of India National Symposium in Chemistry*** organized by CSIR-National Chemical Laboratory, Pune, ***India***, February 6–8, 2015.
- ***Syam Kandula***, Participated in the ***International Conference*** *on* ***Modern Trends in Inorganic Chemistry*** organized by Department of Chemistry, ***IIT Roorkee, India***, December 13–16, 2013.
- ***Syam Kandula*** et al., Poster presentation on "Synthesis of silica@cadmium sulfide core@shell nanoparticles by simple thermal decomposition approach", ***International Conference*** on ***Directions in Materials Science*** organized by ***Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore and Indian Institute of Science, Bangalore***, ***India***, 30th November–01st December, 2013.

Personal Details

Father name	: Rajendra Prasad Kandula
Date of birth	: 23rd July 1988
Gender	: Male
Marital status	: Married
Nationality	: Indian
Languages known	: English, Hindi, Telugu, Korean
Permanent address	: Syam Kandula,

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