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Educational baground

Dec 2014- Dec 2017	Postdoctoral Fellow at Materials Science and NanoEngineering, Rice University, Houston, USA
Feb 2014- Dec 2014	Research Associate at Materials Engineering, Indian Institute of Science, Bangalore, India
Aug 2009-Jan 2014	Doctoral Student at Materials Engineering, Indian Institute of Science, Bangalore, India
Aug 2004-May 2008	Bachelor of Technology, Metallurgical and Materials Engineering National Institute of Technology, Durgapur, WB, India

Research Areas

A. Development of two-dimensional materials and composite for energy application:
The synthesis and properties of innovative 2D materials such as ReS_2, MoS_2, graphene, hBN and carbides are explored in the projects. HRSTEM with atomic composition mapping (HAADAF) is used extensively to probe composition of individual atoms of the 2D sheet.

B. **Development of Porous and Ultra-Low density materials**:
The project focuses on synthesis of carbon, silicon carbide and boron nitride *etc.* based porous materials with ultra-density (lower than 1mg/cc). In-situ mechanical testing attached to SEM with environmental controlled (temperature) is extensively used for understanding mechanical response of the interface.

C. Structure and properties correlation of nanoparticles and its utilization in optical and energy applications
In current project, metallic and ceramic nanoparticles are synthesized in large quantity using chemical synthesis and mechanical milling. The properties of these materials are engineered using tuning synthesis. Extensive TEM and SEM is sued for understanding mechanism of formation and its structure property correlation.

D. Metal-intermetallic based high temperature in-situ composite
The metal-intermetallic and intermetallic-intermetallic composites synthesized using melting and casting of eutectic alloys. Analytical TEM is used for understanding individual phases and its dislocation/twining/deformation behaviour.

E. **Bio-inspired composite and innovative materials and 3D printing**: The project focused on processing of composite based on living species consisting with unique mechanical and functional properties. The materials consist of polymer, metal and ceramic with solid and liquid phases are combined to result in unique structural and functional properties. We utilized 3D printing in processing of such architecture.

Publication in journals

Publication from Indian Institute of Technology Kharagpur and Gandhinagar

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2. Gupta, B.; Gupta, A. K.; Ghosal, P. S.; **Tiwary, C. S.***;Photo-induced degradation of bio-toxic Ciprofloxacin using the porous 3D hybrid architecture of an atomically thin sulfur-doped g-C3N4/ZnO nanosheet, ***Environmental Research***, 183, 109154, 2020.
3. Park, O. K.; Owuor, P. S.; Jaques, Y. M.; Galvao, D. S.; Kim, N. H.; Lee, J. H.; **Tiwary, C. S.***; Ajayan, P. M.; Hexagonal boron nitride-carbon nanotube hybrid network structure for enhanced thermal, mechanical and electrical properties of polyimide nanocomposites. ***Composites Science and Technology***, 188, 107977, 2020.
4. Zhan, G.; Zhang, J.; Wang, Y; Yu, C.; Wu, J.; Cui, J.; Shu, X.; Qin, Y.; Zheng, H.; Sun, J.; Zhang, Y.; **Tiwary, C. S.***; Wu, Y.; MoS2 quantum dots decorated ultrathin NiO nanosheets for overall water splitting . ***Journal of Colloid and Interface Science,*** 566, 411-418, 2020.
5. Kusuma, U.; Katiyar, N. K.; Kumar, R.; Biswas, K.; Singh, A. K.; **Tiwary, C. S.***; Kamble, V.; High Entropy Alloy Nanoparticles Decorated, p-type 2D-Molybdenum Disulphide (MoS2) and Gold Schottky Junction Enhanced Hydrogen Sensing, ***Nanoscale,*** *Just accepted,* 2020.
6. Joyner, J.; Oliveira, E. F.; Yamaguchi, H.; Kato, K.; Vinod, S.; Galvao, D. S; Salpekar, D.; Roy, S.; Martinez, U.; **Tiwary, C. S.***; Ajayan, P. M;Graphene Supported MoS2 Structures with High Defect Density for an Efficient HER Electrocatalysts, ***ACS Applied Materials & Interfaces***, 12, 11,12629-12638, 2020.
7. Nellaiappan, S.; Katiyar, N. K.; Kumar, R.; Parui, A.; Malviya, K. D.; Pradeep, K.G.; Singh, A. K.; Sharma, S.; **Tiwary, C. S.***; Biswas, K.; "High-Entropy Alloys as Catalysts for the CO2 and CO Reduction Reactions: Experimental Realization, ***ACS Catalysis,*** 10658, 2020.
8. Zhang, J.; Zhu, T.; Wang, Yan; Cui, Jiewu; Sun, Jian; Yan, Jian; Qin, Y.; Shu, Xia; Zhang, Yong; Wu, J.; Tiwary, C. S.; Ajayan, P. M.; Wu, Y.; Self-assembly of 0D/2D homostructure for enhanced hydrogen evolution, ***Materials Today***, 2020.
9. Katiyar, N. K.; Nellaiappan, S.; Kumar, R.; Malviya, K. D.; Pradeep, K. G.; Singh, A. K; Sharma, S.; **Tiwary, C. S.***; Biswas, K.;Formic acid and methanol electro-oxidation and counter hydrogen production using nano high entropy catalyst, ***Materials Today Energy***,16, 100393, 2020.
10. Chipara, A. C.; Brunetto, G.; Ozden, S.; Haspel, H.; Kumbhakar, P.; Kukovecz, Á.; Kónya, Z.; Vajtai, R.; Chipara, M.; Galvao, D. S; **Tiwary, C. S.***; Ajayan, P. M.; Nature inspired solid–liquid phase amphibious adhesive, ***Soft Matter,*** 2020, just accepted.
11. Hart, A. H. C; Owuor, P. S; Hamel, J.; Bhowmik, S.; Asif, S.A. S.; Gentles, A. X.; Ozden, S.; Tsafack, T.; Keyshar, K.; Mital, R.; **Tiwary, C. S.***; Ajayan, P. M.; Ultra-low density three-dimensional nano-silicon carbide architecture with high temperature resistance and mechanical strength, ***Carbon***,2020, just accepted.
12. Kuila, S.; Sarkar, R.; Kumbhakar, P.; Kumbhakar, P.; **Tiwary, C. S.***; Kundu, T. K.; Photocatalytic dye Degradation under Sunlight Irradiation using Cerium Ion Adsorbed

Two-dimensional Graphitic Carbon Nitride, ***Journal of Environmental Chemical Engineering.***103942, 2020.

13. Pramanik, A.; Biswas, S.; **Tiwary, C. S.**; Kumbhakar, P.; Sarkar, R.; Kumbhakar, P.; Forster resonance energy transfer assisted white light generation and luminescence tuning in a colloidal graphene quantum dot-dye system, Journal of Colloid and Interface Science, 2020.

14. Nellaiappan, S.; Kumar, R.; Shivakumara, C; Irusta, Silvia; Hachtel, J. A; Idrobo, Juan C.; Singh, A. K; **Tiwary, C. S. *;** Sharma, S; Electroreduction of carbon dioxide into selective hydrocarbon at low overpotential using isomorphic atomic substitution in copper oxide ***ACS Sustainable Chemistry & Engineering. Accepted.***

15. Sajadi, Seyed Mohammad; Woellner, Cristiano F; Ramesh, Prathyush; Eichmann, Shannon L; Sun, Qiushi; Boul, Peter J; Thaemlitz, Carl J; Rahman, Muhammad M; Baughman, Ray H; Galvão, Douglas S; **Tiwary, C.S.***, Ajayan P. M., 3D Printed Tubulanes as Lightweight Hypervelocity Impact Resistant Structures, ***Small, Accepted.***

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17. **Tiwary, Chandra Sekhar***; Paliwal, Manas; Kashyap, Sanjay; Pandey, Praful; Sarkar, Suman; Kundu, Ipshita; Bhaskar, Shakti; Jung, In-Ho; Chattopadhyay, K; Banerjee, Dipankar; Microstructures and mechanical properties of ternary Ti–Si–Sn alloys ***Materials Science and Engineering: A,*** 138472.

18. Nellaiappan, Subramanian; Kumar, Nirmal; Kumar, Ritesh; Parui, Arko; Malviya, Kirtiman Deo; Pradeep, KG; Singh, Abhishek Kumar; Sharma, Sudhanshu; **Tiwary, Chandra Sekhar***; Biswas, Krishanu; Nobel metal based high entropy alloy for conversion of carbon dioxide (CO2) to hydrocarbon ChemRxiv, Accepted in ***ACS Catalysis.***

19. Kumar, Nirmal; Nellaiappan, Subramanian; Kumar, Ritesh; Malviya, Kirtiman Deo; Pradeep, KG; Singh, Abhishek Kumar; Sharma, Sudhanshu; **Tiwary, Chandra Sekhar***; Biswas, Krishanu; Instant and persistent hydrogen production using nano high entropy catalyst, ChemRxiv. Accepted in ***Materials Today Energy.***

20. Susarla, S.; Tsafack, T.; Owuor, P. S.; Puthirath, A. B.; Hachtel, J. A.; Babu, G.; Apte, A.; Jawdat, BenM. I; Hilario, M. S; Lerma, A.; Lou, J.; Wei, B.; Dai, P.; **Tiwary, C. S.***; Ajayan, P. M; High -K dielectric sulfur-selenium alloys, ***Science advances,*** 5 eaau9785.

21. Malviya KD, Oliveira EF, Autreto PAS, Ajayan PM, Galvão. S; **Tiwary, C. S.***, Chattopadhyay K(2019) Mixing the immiscible through high-velocity mechanical impacts: an experimental and theoretical study. ***Journal of Physics D: Applied Physics***, 19, 52:44.

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33. Susarla S, Manimunda P, Jaques YM, Hachtel JA, Idrobo JC, Asif SAS, Galvão DS, **Tiwary CS***, Ajayan PM (2019) Strain-Induced Structural Deformation Study of 2D Mo x W (1- x) S 2. ***Adv. Mater. Interfaces*** 6

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35. Bhowmick S, Ozden S, Bizão RA, Machado LD, Asif SAS, Pugno NM, Galvão DS, **Tiwary CS***, Ajayan PM (2019) High temperature quasistatic and dynamic mechanical behavior of interconnected 3D carbon nanotube structures. ***Carbon*** N. Y. 142:291–299

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International/national conference proceeding: 24

Total No of publication: 245, Total citation->4800, h-index-35

For detail list: Google scholar **(Chandra Sekhar Tiwary)**

Patents:
International

1. Nickel-aluminium-zirconium alloys: **C. S. Tiwary**, S. Kashyap, O. E. Femi, D. Banerjee, K. Chattopadhyay, US Patent no 14/383,082.

2. Solid-liquid polymer as adhesive, A. Chipara, **C. S. Tiwary**, P. M. Ajayan, Fluorine and hydrogen-based adhesive compositions and methods of making the same.US20190218431A1United States

3. Room temperature sintering of graphene using mechanochemistry. M. Kabbani, **C. S. Tiwary**, P. M. Ajayan. Provisional filled
4. Crosslinking of egg white. P. Owuor, **C. S. Tiwary**, P. M. Ajayan, Provisional filled.
5. N- doped Graphene QD for thermal catalysis, J. Wu, **C. S. Tiwary**, P. M. Ajayan, O. Ihab, N. Chopra (SABIC). Provisional filled
6. Cryo-treatment for QDs.J. Wu, **C. S. Tiwary**, P. M. Ajayan, O. Ihab, N. Chopra (SABIC). Provisional filled

National

7. Development of Cryomill for bulk processing and manufacturing of suspending metallic and alloy Nanoparticle: Inventors: **C. S. Tiwary**, K. Chattopadhyay, (Commercialized by Tau Instruments, India)

Awards

Feb 2020	Excellent microscopist of the year by electron microscopy society of India
	Young metallurgist of the year by ministry of steel, govt. of india

Nov. 2019	Alain Reza Yavari Young/junior Scientist Award -International Society of ISMANAM
July 2019	Indian Institute of Metal and American society of materials north American lecturer award
July 2019	Ramanujan Fellowship, SERB, DST, India.
April 2018-2022	Visiting Scientist fellow by American Physical Society and Brazilian academy of science (SBF).
Jan 2017- Feb 2017	
May 2007-July 2007	Sumer Research Fellow, IAS, INSA, INAE, Indian Institute of Science, Bangalore