

Sponsored Research Projects (Completed/Ongoing):

- Development of efficient and robust working electrodes/photocatalysts for solar energy conversion to hydrogen via photoelectrochemical/photocatalytic splitting of water: Next level up-scaling of laboratory experience. Sanction: DST/TMD/HFC/2K18/16(C), Dated: 01.09.2020; Amount: Rs. 54,34,219; Funded by: DST, Govt. of India; Status: Ongoing
- Studies on novel semiconductors towards increasing the efficiency of PEC water splitting for hydrogen generation. Sanction: MNRE/103/241/2015-NT, Dated: 29.06.2018; Amount: Rs. 3,48,97,000; Funded by: MNRE, Govt. of India; Status: Completed
- Semiconductor chip/chiplet based novel approaches for efficient Solar-Water Splitting: A. Photoelectrochemical Hydrogen Generation; B. Photocatalytic Hydrogen Generation. Indo-US Research Project in collaboration with Arizona State University, Arizona, USA; Sanction: F. 194-1/2015/IV(IC) (2015-2018); Funded by: UGC, Govt. of India under '21st Century Knowledge Initiative Scheme'; Amount: Rs. 1,16,86,000; Status: Completed
- Synthesis and characterization of novel metal oxides for solar hydrogen generation via photoelectrochemical/photocatalytic splitting of water. Sanction: 2013/37C/21/BRNS (2013-2017); Funded by: DAE-BRNS, Govt. of India; Amount: Rs. 24,96,550; Status: Completed
- A study on preparation and characterization of nanostructured zinc oxide for its possible application in PEC splitting of water. Sanction; F:37-123/2009 (SR); Funded by: UGC, Govt. of India; Amount: Rs. 5,54,800; Status: Completed
- Studies on solar light induced splitting of water for hydrogen production using mixed oxide semiconductors. Sanction: 2007/37/44/ BRNS/2910; Funded by: DAE-BRNS, Govt. of India; Amount: Rs. 27,05,455; Status: Completed
- An Investigation on the role of some dye sensitizers in doped metal oxide based Photoelectrochemical cells. Sanction: F:30-36/2004 (SR); Funded by: UGC, Govt. of India; Amount: Rs. 8,72,600; Status: Completed
- Development of two wet chemical processes for the synthesis of nanostructured doped TiO₂ and Fe₂O₃ based photocatalysts having possible applications in solar splitting of water. Sanction: 8020/RID/R&D-118/2001-02; Funded by: AICTE, Govt. of India; Amount: Rs. 5,00,000; Status: Completed
- Generation, Storage and Distribution of Solar Hydrogen. Sanction: DST/TSG/SH/2011/106-G; Funded by: DST, Govt. of India; Amount: Rs. 90,45,000; Status: Completed
- Experimental and First-principle theoretical studies of metal oxide nano-architectures for photoelectrochemical splitting of water. Sanction No.: SR/NM/NS-147/2010 (G); Funded by: DST, Govt. of India; Amount: Rs.52,00,000; Status: Completed
- Transition metal oxide based nano-architectures for photoelectrochemical hydrogen generation. Indo-US Research Project in collaboration with University of Maryland, USA; 'Materials World Network Programme'; Sanction No.: DST/INT/NSF-MWN/Proj-03/07; Funded by: DST, Govt. of India and NSF, US Govt.; Amount: Rs.16,72,650 (DST Share); Status: Completed
- A study on nanostructured metal oxides preparation, characterization & the effect of swift heavy ion irradiation for possible application in photoelectrochemical splitting of water. Sanction No.: SR/S5/NM-12/2006; Funded by: DST, Govt. of India; Amount: Rs. 61,60,000; Status: Completed

- A study on the multilayered nanostructured metal oxides for efficient photosplitting of water. Sanction No.: SP/S2/CMP-47/2005; Funded by: DST, Govt. of India; Amount: Rs. 23,92,000; Status: Completed
- A study on preparation & characterization of nanostructured copper oxide for their possible application in PEC splitting of water. Sanction No.: F:31-147/2005 (SR); Funded by: UGC, Govt. of India; Amount: Rs. 5,34,600; Status: Completed
- Experimental studies on preparation of doped Fe₂O₃ semiconductor for their possible use in photoelectrochemical splitting of water. Sanction No.: SP/S2/M-30/2000; Funded by: DST, Govt. of India; Amount: Rs. 14,67,800; Status: Completed

Research Supervision: PhD – 12; MPhil – 4; MSc Dissertation – 43

Patents granted (Indian Patent)

- Partially crystalline nitrogen doped zinc oxide for unbiased photoelectrochemical water splitting for hydrogen generation, Patent No. 390045, February 22, 2022.
- Hydrogen production using highly crystalline ZnO for photoelectrochemical water splitting, Patent No. 380009, October 26, 2021.
- Partially crystalline nitrogen doped titanium dioxide for unbiased photoelectrochemical water splitting for hydrogen generation, Patent No. 373104, July 29, 2021.

Selected Research Publications

- Agarwal, A., Chaudhary, Y.S., Satsangi, V.R., Dass, S. and Shrivastav, R., A new route to synthesize titanium doped photosensitive hematite, *Curr. Sci.*, 85, 101-104 (2003).
- Dass, S., Chaudhary, Y.S., Agrawal, M., Saroj, Shrivastav, A., Shrivastav, R. and Satsangi, V.R. Nanostructured Mn-doped and undoped CuO thin films – PEC studies. *Indian J. of Physics*, 78A (2), 229 -231 (2004).
- Chaudhary, Y.S., Khan S.A., Shrivastav, R., Satsangi, V.R. Prakash S, Avasthi D.K. and Dass, S., A study on the photoelectrochemical properties of copper oxide, *Int. J. Hydrogen Energy*, 29, 131-134 (2004).
- Chaudhary, Y.S., Agarwal, A., Shrivastav, R., Satsangi, V.R. and Dass, S. A Study on 170 MeV Au¹³⁺ Irradiation Induced Modifications in Structural and photoelectrochemical Behavior of Nanostructured CuO Thin Films, *Nucl. Instr. and Meth. B*, 225, 291-296 (2004).
- Chaudhary, Y.S., Khan, Saif A., Shrivastav, Rohit, Satsangi, Vibha R., Prakash, S., Tiwari, Umesh K., Avasthi, D.K., Goswami, N. and Dass, S. Modified Structural and Photoelectrochemical Properties of 170 MeV Au¹³⁺ Irradiated Hematite, *Thin Solid Films*, 492, 332-336 (2005).
- Chaudhary, Y.S., Shrivastav, R., Satsangi, V.R. and Dass, S. Synthesis and Characterization of Nanostructured Undoped/Doped CuO Films and their Application in Photoelectrochemical Water Splitting, *Nanotech.*, 2, 601 – 603 (2005).
- Chaudhary, Y.S., Khan, Saif A., Tripathi, C., Shrivastav, Rohit, Satsangi Vibha R. and Sahab Dass. A Study on the 170 MeV Au¹³⁺ Irradiated Nanostructured Metal Oxide (Fe₂O₃ and CuO) Thin Films for PEC Application. *Nucl. Instr. and Meth. B*, 244 (1), 128-131(2006).
- Kumari, S., Tripathi, C., Singh, Aadesh P., Chauhan, D., Shrivastav, R., Dass, S. and Satsangi, V.R.Characterization of Zn doped hematite thin films for photoelectrochemical splitting of water, *Current Science*,91(8), 1062-1064 (2006).

- Chauhan, D., Satsangi, V.R., Dass, S. and Shrivastav, R. Preparation and Characterization of Nanostructured CuO thin films for Photoelectrochemical Splitting of Water, *Bull. Mater. Sci.*, 29, 1-8 (2006).
- Kumari, Saroj., Chaudhary, Y.S., Agnihotry, S.A., Tripathi, C., Verma, A., Chauhan, D., Shrivastav, Rohit., Dass, Sahab and Satsangi, Vibha R. A photoelectrochemical study of nanostructured Cd-doped Titanium oxide, *Int. J. Hydrogen Energy*, 32, 1299-1302 (2007).
- Kumari, S., Singh, Aadesh P., Tripathi, C., Chauhan, D., Dass, S., Shrivastav, R., Gupta, V., Sreenivas, K. and Satsangi, V.R. Enhanced Photoelectrochemical response of Zn-doped Hematite, *Int. J. Photoenergy*, Article ID 87467, 1-6 (2007).
- Satsangi, V.R., Kumari, S., Singh, A.P., Shrivastav, R. and Dass, S. Nanostructured Hematite for Photoelectrochemical Generation of Hydrogen, *Int. J. Hydrogen Energy*, 33, 312-318 (2008).
- Singh, A.P., Tripathi, A., Shrivastav, R., Dass, S. and Satsangi, V.R. New Benchmark to Improve the Photoelectrochemical Properties of Hematite, *Solar Hydrogen and Nanotechnology III, Proc. of SPIE*, 7044, 70440H, 1-8 (2008).
- Singh, A.P., Kumari, S., Shrivastav, R., Dass, S. and Satsangi, V.R. Iron doped nanostructured TiO₂ for photoelectrochemical generation of hydrogen, *Int. J. Hydrogen Energy*, 33, 5363-5368 (2008).
- Gupta, M., Shrivastava, J., Sharma, V., Solanki, A., Singh, A.P., Satsangi, V.R., Dass, S. and Shrivastav, R. Enhanced Photoelectrochemical Activity of 120 MeV Ag⁺⁹ Irradiated Nanostructured Thin Films of ZnO For Solar-Hydrogen Generation via Splitting of Water, *Advanced Material Research*, 67, 95-102 (2009).
- Singh, A.P., Kumari, S., Shrivastav, R., Dass, S. and Satsangi, V.R. Improved PEC Response in Hematite by High Energy Ag⁹⁺ Ion Irradiation, *J. Physics D: Applied Physics*, 42, 08530 (2009).
- Gupta, M., Sharma, V., Shrivastava, J., Solanki, A., Singh, A.P., Satsangi, V.R., Dass, S. and Shrivastav, R. Preparation and Characterization of Nanostructured ZnO Thin Films for Photoelectrochemical Splitting of Water, *Bull. Mater. Sci.*, 32(1), 23-30 (2009).
- Kumari, S., Singh, A.P., Sonal, Deva, D., Shrivastav, R., Dass, S. and Satsangi, V.R. Spray pyrolytically deposited nanoporous Ti⁴⁺ doped hematite thin films for efficient photoelectrochemical splitting of water, *Int. J. Hydrogen Energy*, 35, 3985-3990 (2010).
- Singh, A.P., Kumari, S., Tripathi, A., Singh, F., Gaskell, K.J., Shrivastav, R., Dass, S., Ehrman, S.H. and Satsangi, V.R. Improved Photoelectrochemical Response of Titanium Dioxide Irradiated with 120 MeV Ag⁹⁺ Ion, *J. Phys. Chem. C*, 114 (1), 622-626 (2010).
- Srivastav A., Verma A., Banerjee A., Khan S. A., Gupta M., Satsangi V. R., Shrivastav R., Dass S., Gradient Doping- A Case Study of Ti-Fe₂O₃ towards Improved Photoelectrochemical Response, *Physical Chemistry Chemical Physics*, 18, 32735-32743 (2016).
- Verma A., Srivastav A., Banerjee A., Sharma D., Sharma S., Singh U. B., Satsangi V. R., Shrivastav R., Avasthi D. K., Dass S., Plasmonic Layer Enhanced Photoelectrochemical Response of Fe₂O₃ Photoanodes, *Journal of Power Sources*, 315, 152-160 (2016).
- Verma A., Srivastav A., Sharma D., Banerjee A., Sharma S., Satsangi V. R., Shrivastav R., Avasthi D. K., Dass S., A Study on the Effect of Low Energy Ion Beam Irradiation on Au/TiO₂ System for its Application in Photoelectrochemical Splitting of Water, *Nuclear Instruments and Methods B: Beam Interactions with Materials and Atoms*, 379, 255-261 (2016).

- Verma A., Srivastav A., Khan S. A., Satsangi V. R., Shrivastav R., Avasthi D. K., Dass S., Enhanced Photoelectrochemical Response of Plasmonic Au Embedded BiVO₄/Fe₂O₃ Heterojunction, *Physical Chemistry Chemical Physics*, 19, 15039-15049, (2017).
- Srivastav A., Kumar P., Verma A., Smith Y. R., Satsangi V. R., Shrivastav R., Waghmare U. V., Dass S., Experimental and First-principles Studies of BiVO₄/BiV_{1-x}Mn_xO_{4-y} n-n Homojunction for Efficient Charge Carrier Separation in Sunlight Induced Water Splitting, *Int. J. Hydrogen Energy*, 43, 15815-15822 (2018).
- Verma A., Srivastav A., Sharma S., Badami P., Satsangi V. R., Shrivastav R., Kannan A. M., Avasthi D.K., Dass S., MWCNTs and Cu₂O Sensitized Ti-Fe₂O₃ Photoanode for Improved Water Splitting Performance, *Int. J. Hydrogen Energy*, 43, 6049-6059 (2018).
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- Biswas N. K., Srivastav A., Saxena S., Verma A., Dutta R., Srivastava M., Upadhyay S., Satsangi V. R., Shrivastav R., Dass S., n-TiO₂ crystal seeds incorporated in amorphous matrix for enhanced solar hydrogen generation: Experimental & first-principles analysis, *Int. J. Hydrogen Energy*, 47, 22415-22429 (2022).
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