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Education

B.Sc. 2001	Physics	Jaihind College, University Mumbai, India
M.Sc. 2003	Physics Specialization: Material Science	Dept. of Physics, University of Mumbai, India
Ph.D. 2007	Physics Specialization: Hydrogen Energy	Department of Physics, University of Trento, Italy

Work History

May. 2014-present	UGC-Assistant Professor, Department of Physics, University of Mumbai, India.
Jan. 2012-Apr. 2014	Senior Researcher (Equivalent to Assistant Professor), University of Trento, Italy
Jan. 2010-Dec. 2011	Researcher, University of Trento, Italy
Nov. 2007-Dec. 2009	Postdoctoral Research Associate, University of Trento, Italy.
May 2003-Oct. 2004	Junior Research Fellow, Bhabha Atomic Research Center (BARC), India

Awards and Fellowships

- ✓ **Jr. Research Fellowship** (May 2003– Oct. 2004) was awarded for Bhabha Atomic Research center (BARC), Department of Atomic Energy (DAE). funded project “Study and Development of Radiation Resistant Materials for ADSS” undertaken by Prof. D. C. Kothari.
- ✓ **PhD Research Fellowship** (Nov. 2004- Oct. 2007) was awarded for the work to be conducted during PhD at University of Trento, Italy, jointly by Italian External Affair Ministry, Rome and Italian Embassy, New Delhi, India. Selection was done at national level in India.
- ✓ **Post-Doc Fellowship** (Nov. 2007-Dec. 2009) was awarded for the three years to perform research activity in Lab IdeA, at University of Trento, Italy, under supervision of Prof. Antonio Miotello.
- ✓ **Faculty Recharge Program Assistant Professor awardee** (2014) selected by University Grant Commission (UGC), New Delhi, India. I was among 30 candidates from 3500 applicants selected by Govt. of India, as an Assistant Professor on national level and gave us the choice of 50 Universities to be posted as Assistant Professor with Research grant.
- ✓ **“International Young Researcher”** by Italian government to visit University of Trento, Italy for two month (Nov-Dec. 2016) to carry out collaborated research work.

Research Profile:

<i>Number of Publications in Peer-reviewed International Journal:</i>	87
<i>Book Chapters:</i>	3
<i>Number of citations:</i>	3335
<i>h-index:</i>	32
<i>i10-index:</i>	53

Research Specialization:

Thrust Area:

- *Material Science*
- *Energy (Hydrogen) & Environmental (water purification) Science,*
- *Nanoscience & Nanotechnology.*

Primary Interests:

- ✓ Production of clean energy based on Hydrogen fuel
- ✓ Developing low cost nano-catalyst for hydrogen production for clean energy utilization by water splitting and hydrolysis of chemical hydrides.
- ✓ Forming heterojunctions of semiconductors for efficient photocatalytic water splitting and water purification under Solar energy.
- ✓ Synthesizing thin film catalyst by various physical and chemical techniques for easy recovery and reuse in industries based on energy and environment sectors.
- ✓ Architecting various nanostructures in thin film by using Pulsed laser Deposition (PLD) and RF-magnetron sputtering.

Other Interests:

- ✓ Developing nanomaterials for hydrogen (separation and storage) energy based on thin films.
- ✓ Exploring high temperature resistant absorber materials for collecting concentrated solar power.
- ✓ Studying interaction behaviour of nanoparticles with human proteins for targeted drug delivery.
- ✓ Incorporating magnetic nanoparticles in liquid-crystal materials for blue phase based display applications.

Research and Development Experience

Present ongoing Research Projects at University of Mumbai:

1. Development of Nano-composite Photocatalyt for Production of solar fuel (H₂) from Water:

- To develop efficient, low cost, stable, efficient and non-toxic photocatalyst (PC) composite materials for H₂ production by water splitting (WS) under solar light with high quantum efficiency of ~10 %
- Combining four strategies namely band gap-, interface-, nano-, and cocatalyst-engineering, in the PC nanocomposite.
- Development of photoanode for photoelectrochemical cell in form of core-shell nanotubes decorated with electrocatalyst nanoparticles for OER reaction.
- Realizing PC in the form of nanocomposite of n-type hollow urchin and p-type nanosheet decorated with electrocatalyst NPs for direct WS.
- Testing photoanode and PC for stability, reusability, and durability for WS reaction to check the viability for industrial application.

2. Design and development of low cost materials for application in photocatalytic water splitting.

- Design a photocatalyst composite of CuTiO_x decorated with CoMo(OH)_x (co-catalyst) and supported on rGO, using first-principles technique.
- Detailed band structure calculations are performed for CuTiO_x PC by varying Cu:Ti ratio to evaluate the suitability of the band gap and band edges for water splitting reaction.
- The most suitable CoMo(OH)_x@CuTiO_x assembly will be used to make a composite with rGO for use as a photoanode material.

3. Design, synthesize and investigation of morphological dependent activity of Cobalt based electrocatalysts to improve the efficiency and efficacy of hydrogen production by electrolysis of water.

- Synthesis of bare and transition metal doped Co Borides, Co Chalcogenides (S, Se) and Co Phosphide nano-structured thin films electrocatalyst for hydrogen production.
- Optimization of various experimental parameters to tune size, shape, roughness, thickness and composition of nanocatalyst to achieve required catalytic activity with high tolerance against deactivation.

4. Mineralizing organic pollutant from industrial waste water using photocatalyst under solar light with high efficiency and stability.

- Incorporating metals (Fe, Cr, Ag, etc.) and non-metals (N, B, P etc.) dopants into most stable photocatalyst such as TiO₂ and g-C₃N₄ to tune the band gap and reduce recombination process.
- Forming nanocomposite of codoped TiO₂ and g-C₃N₄ with reduced graphene oxide to achieve enhance charge mobility and active surface area.

5. Nano-catalyst based on hierarchical structures for H₂ production by hydrolysis of chemical hydrides.

6. Synthesizing bio-compatible BaTiO₃ piezoelectric nanoparticles and studying its interaction with human proteins before implementing these nanoparticles for in-vivo eliminating of cancer cells.

7. Mixing nickel zinc ferrite magnetic nanoparticles with nematic and chiral liquid crystal to improve the blue phase temperature range and reduce the power consumption for display application.

Present ongoing Research collaborative Projects with Universities and Research Institutes:

1. University of Trento, Italy:

- Developing stable mixed metal oxides based nanocatalyst thin films with PLD and RF-magnetron sputtering, for hydrogen production by water splitting and for photocatalytic degradation of based organic pollutant under solar light.
- Realizing stable black coating by RF-magnetron sputtering for absorbing concentrated solar radiation from parabolic reflecting mirrors.

2. University of Liverpool, UK (funding from GCRF, UK):

- Jointly we are building Low cost photocatalytic systems for H₂ production by water splitting under solar light: a UK-India solution to achieve high solar to H₂ efficiency.
- Major aim is to increase the TRL level of H₂ production by solar driven photocatalyst with expertise research team that involves Uni. Mumbai, Uni. Trento, and Uni. Liverpool.

3. Bhabha Atomic Research Center (BARC), Mumbai, India:

- Experimentally developed electrocatalysts and photocatalysts are modelled computationally to study its electrical, optical, mechanical and compositional behaviour by using DFT calculations.

4. Indian Institute of Technology (IIT) Bombay, India:

- Investigating cobalt-based electrocatalyst synthesized in our lab for oxygen reduction reaction at IIT-B.

5. Institute of Chemical Technology (ICT), Mumbai, India;

- Testing the possibility of using the photocatalyst prepared in our lab for fine chemical synthesis under solar light.

Present ongoing Projects with Industry:

- Manufacturing TiO₂ and doped-TiO₂ coatings by RF-magnetron sputtering for watches and ornaments as an antibacterial coatings (*Surface and Modification Technology LTD, Mumbai*)

Infrastructure development at University of Mumbai:

- Fully functional nanomaterials synthesis lab using chemical (solgel, hydrothermal, microwave reaction etc.) and physical (ball-milling, sputtering etc.) techniques.
- Thin film deposition lab involving RF-sputtering, DC-sputtering, thermal evaporation, Spin coating, dip coating, and electroplating.
- Testing lab with potentiostat, and solar simulator for hydrogen production by electrocatalytic & photocatalytic water splitting and by hydrolysis of chemical hydrides. Mineralization of organic pollutant from waste water is also tested in this lab.
- Laboratory for material characterization with X-ray diffraction and X-ray Fluorescence.

Past projects handled at University of Trento, Italy as a Researcher and Post-Doc:

- Different cobalt-based compound catalyst powders based on Co-M-B (where M = Ni, Fe, Cu, Cr, Mo, & W), Co-P-B and Co-M-P-B were explored for H₂ production by hydrolysis and thermolysis of chemical hydrides.
- Decorating Co-B nanoparticles on rough carbon film by PLD for H₂ production by hydrolysis of sodium borohydride.
- Fabrication of Pd nanoparticles supported on rough carbon film by PLD for H₂ production by hydrolysis of sodium borohydride.

- Recycling of NaBO₂ to NaBH₄ by thermal reduction at moderate temperature using catalyst.
- Investigating TiO₂, doped-TiO₂ and Multilayer TiO₂ thin film photocatalysts deposited by RF-magnetron sputtering for H₂ production by photocatalytic water splitting.
- Architecting nanostructures of Co and Fe oxides in form of immobilized coatings by PLD for photocatalytic degradation of organic pollutants.
- Producing 1D-nanostructures in coatings by PLD and RF-magnetron sputtering.

PhD research work at University of Trento, Italy

Thesis Title “The role of thin films in hydrogen science and technology.”

- Exploring Mg-Al and Mg-Ni multilayer thin film for H₂ storage application.
- Development of Co-B nanoparticles assembled thin film by PLD for H₂ production by hydrolysis of sodium borohydride.
- Fabrication of Pd nanoparticles supported on rough carbon film by PLD for H₂ production by hydrolysis of sodium borohydride.
- Synthesis of nano-porous silica thin film by sol-gel method for H₂ separation.
- Studies on structural evolution of nano-porous silica thin film by positron annihilation spectroscopy and Fourier transform infrared spectroscopy.
- Fabrication of membrane based on Pd-Ag nanolayers over silica film with nanochannels for H₂ purification.

Project handled as JRF and Master student at BARC and Uni. of Mumbai, India:

- Micro-structural characterization of the 316SS and Inconel 718A by TEM, at different “DPA”s and temperatures: these materials are potential candidates for structural material of accelerator Driven Sub-critical System (ADSS).
- Study on radiation induced redistribution of elements in the chosen steel using irradiation and by modeling and simulation.

Technical expertise

- Comprehensive knowledge of handling Thin film deposition techniques like: Pulsed laser Deposition, RF-Magnetron Sputtering, DC Sputtering, E-beam deposition, Ion Beam Assisted Deposition, 30 KeV Ion Implanter, Sol-gel method, Spin deposition, Dip coating.
- Extensive experience of handling and/or data analysing for various characterization techniques such as: Fourier Transform Infrared spectroscopy, Raman Spectroscopy, X-ray Photoelectron Spectroscopy, Scanning Electron Microscopy, Transmission Electron Microscopy, Positron Annihilation Spectroscopy, Atomic Force Microscopy, Thermal Desorption Spectroscopy, UV-Visible Spectroscopy, X-ray Diffraction, BET Surface area, Photoluminance spectroscopy, and Time resolved Photoluminance spectroscopy.
- Material synthesis by Chemical Methods such as: Hydrothermal method, Impregnation method, Electroless deposition, Chemical reduction method.
- Electrochemistry: Potentiostat-galvanostat system with electrochemical impedance spectroscopy, Photo-electrochemical cell attached with gas chromatographer, Solar simulator– for photocatalytic measurements.

Successful funding obtained through Projects (excluding Travel grant and self-Fellowship)

Title of the project	Role	Sponsor	Duration	Amount
Development of Nano-composite Photocatalyst for Production of solar fuel (H ₂) from Water	PI	SERB, DST, India	(March 2017-Feb. 2020)	Rs. 3,000,000.
Design, synthesis and investigation of morphological dependent activity of Cobalt based catalysts to improve the efficiency and efficacy of hydrogen production by electrolysis of water	PI Fellowship for PhD student	DST, India	(August 2017-July 2020)	Rs. 2,130,000.
Development of low CuTiO photocatalyst composite for solar water splitting: theoretical and experimental investigation	PI Fellowship for PhD student	DST, India	(August 2017-July 2019)	Rs. 820,000
Study of physical parameters in doped liquid crystalline materials	PI Fellowship for PhD student	University Grant Commission (UGC), India	(June 2015-May 2019)	Rs. 2,190,400
Anti-bacterial coatings for watches and ornaments (Industrial Project)	PI Fellowship for PhD student	Surface and Modification Technology, LTD, India	June 2017-Dec 2018	Rs. 1,000,000
Development of Nano-catalyst and photocatalyst of transition metals with an exceptional efficiency and activity, in order to replace traditional noble metal catalyst in renewable energy and environmental control.	PI Start-up grant	UGC, India	April 2015-March 2017	Rs. 600,000 (\$ 10,000).
Low cost photocatalytic systems for H ₂ production by water splitting under solar light: a UK-India solution to achieve high solar to H ₂ efficiency	Co-PI	GCRF, UK	Sep. 2017-March 2019	£ 31,000 (\$ 40,000)
Earth-abundant, low-cost and efficient quaternary amorphous boride electrocatalysts for overall water-splitting	Co-Inv	Ministry of Higher Education, Saudi Arabia	Aug 2018-July 2019	Riyal 40,000 (\$ 10,800).
Exploiting Nanotechnology to improve the catalytic efficiencies of transition metals: A route to replace noble metals in catalysis field.	Co-Inv	Marie Curie Funding, European Union	March 2011-Feb. 2014	Euros 149,820 (\$ 172,300).
Nano-catalyst for hydrogen production.	Co-Inv	Provincia Autonoma di Trento (PAT), Italy	Feb. 2008-Jan. 2011	Euros 200,000 (\$ 230,000).
Ceramic Membranes for Hydrogen separation	Project Assistant	PAT, Italy	June 2006-May 2008	Euros 100,000 (\$ 115,000)

Teaching experience (Jan. 2012- present)

- Core courses taught at Dept. of Physics, University of Mumbai, India
Experimental Physics, Atomic and Molecular Physics
- Elective courses taught at Dept. of Physics, University of Mumbai, India
Energy Studies, Nanoscience & Nanotechnology, Fundamental of Material Science, Materials and its Applications, Semiconductor Physics.
- Courses taught at Dept. of Physics, University of Trento, Italy
Materials Science, Catalyst for Energy and Environment, Hydrogen Science and Technology

Advisor and Co-advisor for PhD students

Name	Thesis Title	Place	Status
Rupali Dholam	Development of Solar Sensitive Thin Film for Water Splitting and Water Heating using Solar Concentrator	University of Trento, Italy	Completed (2010)
Rohan Fernandes (received Best PhD thesis Award)	Synthesis, characterization, and field-test of nanocatalysts for hydrogen production by hydrolysis of chemical hydrides	University of Trento, Italy	Completed (2011)
Alessandra Santini	Synthesis and characterization of nanostructures for catalysis	University of Trento, Italy	Completed (2012)
Raju Edla	Development of Cobalt based Nano Catalysts for Energy and Environment	University of Trento, Italy	Completed (2014)
Renuka Pawar	Development of nanostructured doped TiO ₂ photocatalyst for degradation of Organic pollutants	University of Mumbai, India	Completed (2015)
Abhijeet Bhogale	Study of interaction of metal and Metal oxide nanoparticles with Different proteins	University of Mumbai, India	Completed (2015)
Suraj Gupta	Synthesis of nanocatalysts and their applications to hydrogen production by electrolysis of water and hydrolysis of chemical hydrides	University of Mumbai, India	Completed (2016)
Asha Yadav	Design and Development of low-cost materials for application in photocatalysis and hydrogen storage	University of Mumbai, India	Thesis submitted (2018)
Jessy PJ	Study of physical parameters in doped liquid crystalline materials	University of Mumbai, India	Writing Thesis (2018)
Manisha Yadav	Development of Nanostructured plasmonic codoped TiO ₂ for efficient removal of organic pollutant	University of Mumbai, India	Writing Thesis (2018)
Avani Chundari	Design, synthesis and investigation of morphological dependent activity of Cobalt based nano-catalysts to improve the efficiency of hydrogen production by electrolysis of water	University of Mumbai, India	Ongoing
Nirmala Thorat	Development of industrial coatings for biomedical and environmental application	University of Mumbai, India	Ongoing

Synergistic Activities

- **Peer-reviewed manuscripts** for, *Journal of American Ceramic Society, Applied Catalysis B: Environmental, Applied Catalysis A: Chemical, International Journal of Hydrogen Energy, Applied Physics Letters, Catalysis Today, Journal of Power Sources, Journal of Physical Chemistry C, Journal of Environmental Management, Applied Surface Science, Carbon, ACS Applied Materials & Interfaces, Journal of Catalysis, Colloids and Surfaces B: Biointerfaces, Solar Energy Materials and Solar Cells, Catalysis Science & Technology, RSC Advance, Electrochimica Acta. Journal of Molecular Catalysis A: Chemical*
- **Reviewed funding proposals** for i) DST, India, ii) BRNS DAE, India, and iii) Czech Science Foundation, Czech Republic.
- **Seminars, Conferences, Symposia, Workshops etc. Organized as Convenor:**
 - National Hands-On Workshop in Solar-Cell Technology for Students on “Solar PV Design and Installation” on 9th to 10th March 2017 at Department of Physics, University of Mumbai, Mumbai.
 - Symposia on “Atomic Energy for Holistic Human Development: Present and Future” at Indian Science Congress on 5th January 2015 at Green Technology Auditorium, Kalina campus. University of Mumbai.
 - Symposia on “Science and Technology for Inclusive Development” at Indian Science Congress on 7th January 2015 at Convocation Hall, Fort campus University of Mumbai.
- **Innovating Processes developed in Teaching and Learning:**
 - Creating Job Opportunity in Solar-Cell Technology Hands-On Workshop for Students on “Solar PV Design and Installation” on 9th to 10th March 2017.
 - Regularly organizing Industrial visit and Renewable energy site visit for the master students to encourage for taking up career in energy sectors.
- **Served or serving on graduate thesis committee for**
 - Graduate thesis committee member for Ph.D and Master’s students at University of Mumbai, India.
 - Graduate thesis committee member for Master’s students at University of Trento, Italy.
- **Visiting faculty at National Centre for Nanoscience and Nanotechnology, University of Mumbai, India**
- **Participation in Curricular Development at University of Mumbai:**
 - Started a new elective course of Energy Studies.
 - Convener of the Syllabus Committee- Materials Science, Experimental Physics and Energy Studies
 - Drafted a complete syllabus for MSc in Energy Studies.
 - Member of Organized Committee of workshop, International and national conference
 - MSc Project coordinator of the Department of Physics, University of Mumbai

➤ **Invited talks at Conferences and Workshop:**

- Nanostructured Interfaces and Surfaces (NIS 2005) **Colloquium, Turin, Italy:** on *Nb-doped Mg thin films for hydrogen storage.*
- European Material Research Society (E-MRS 2007) **Spring meeting, Strasbourg, France:** on *Pd/C catalyst film for hydrolysis of NaBH₄*
- Workshop on Solar harvesting Materials (2009) **University of Trento, Italy:** on *Photocatalyst for H₂ Production by Water Splitting.*
- International Conference on Clean Energy (ICCE 2010) **Famagusta, North Cyprus** on *Carbon supported Co-B nanoparticles-assembled film catalyst synthesized by Pulsed Laser Deposition for hydrolysis of Ammonium Borane.*
- 7th IUPAC International Conference on Novel materials and their Synthesis (NMS-VII) & 21st International Symposium on Fine Chemistry and Functional Polymers (FCFP-XXI) (2011) **Shanghai, China:** on *Photocatalysts, nanocatalysts, and chemical hydrides to produce hydrogen and to store solar energy.*
- National workshop on Nanostructured Materials for Energy Devices and Environment (2011) **Univ. of Mumbai, India:** on *Hydrogen production by low cost nanocatalyst.*
- International workshop on Physics for Energy & Environment, (2013) **Univ. of Mumbai, India:** on *Efficient hydrogen production using nanocatalyst and photocatalyst film.*
- Material research society India Meeting of young researcher, (2014), **IIT, Bombay, India:** on *“Nano-catalyst” a future vector for Hydrogen Energy*
- 7th Asia-Pacific Congress on Catalysis (APCAT-7) (2017), **Lalit Hotel, Mumbai, India:** on *Role of X-rays to understand Catalyst*
- Third international conference on nano materials: Synthesis, characterization and applications, (2018). **Mahatma Gandhi University, Kottayam, Kerala, India:** on *Laser-inducing liquid superheating and phase explosion to produce nanomaterials relevant for catalysis and the photocatalysis.*
- Popular talks on *“CATALYST A Magical Material”* at various colleges in **Mumbai, India**

List of Publications

- [1] S.S. Patil, R.P. Fernandes, **N.K. Patel**, P.A. Rayjada, P.M. Raole, D.C. Kothari, Corrosion resistance study of argon implanted and ion-beam-mixed 316 SS, **Surface & Coatings Technology**, 196 (2005) 284–287. (IF = 2.906)
- [2] **N. Patel**, R. Checchetto, A. Miotello, P. Mengucci Thermal Stability of hydrogenated Mg/Al Thin Films, *ISOHIM-2, AIP Conference Proceedings*, 837 (2006) 34-40.
- [3] **N. Patel**, G. Guella, A. Kale, A. Miotello, B. Patton, C. Zanchetta, L. Mirengi, P. Rotolo, Thin films of Co-B prepared by pulsed laser deposition as efficient catalysts in hydrogen producing reactions, *Applied Catalysis A: General* 323 (2007) 18–24. (IF = 4.521)
- [4] **N. Patel**, R. Fernandes, G. Guella, A. Kale, A. Miotello, B. Patton, C. Zanchetta, P. M. Ossi, V. Russo, Pulsed-laser deposition of nanostructured Pd/C thin films. A new entry into metal-supported catalysts for hydrogen producing reactions, *Applied Surface Science*, 254 (2007) 1307–1311. (IF = 4.439)
- [5] **N. Patel**, S. Mariazzi, L. Toniutti, R. Checchetto, A. Miotello, S. Dir`e, R S Brusa, Structural evolution of nanoporous silica thin films studied by positron annihilation spectroscopy and Fourier transform infrared spectroscopy, *Journal of Physics D: Applied Physics*, 40 (2007) 5266–5274. (IF = 2.373)
- [6] S. Mariazzi, **N. Patel**, L. Toniutti, R. Checchetto, A. Miotello, R. S. Brusa, Structural characterization and porosity analysis in spin coated silica thin films as gas selective membranes, *Physica Status Solidi (c)*, 4 (2007) 3823-3826. (IF = 1.55)
- [7] R.P. Fernandes, **N.K. Patel**, A. Miotello, D.C. Kothari, Simulation studies of radiation induced segregation in 316SS, *Surface & Coatings Technology* 201 (2007) 8424–8426. (IF = 2.906)
- [8] **N. Patel**, R. Fernandes, G. Guella, A. Kale, A. Miotello, B. Patton, C. Zanchetta, Structured and nanoparticle assembled Co-B thin films prepared by Pulsed Laser Deposition: a very efficient catalyst for hydrogen production, *Journal of Physical Chemistry C*, 112 (2008) 6968-6976. (IF = 4.484)
- [9] **N. Patel**, B. Patton, C. Zanchetta, R. Fernandes, G. Guella, A. Kale, A. Miotello, Pd-C powder and thin film catalysts for hydrogen production by hydrolysis of sodium borohydride, *International Journal of Hydrogen Energy*, 33 (2008) 287 – 292. (IF = 4.229)
- [10] L. Toniutti, S. Mariazzi, **N. Patel**, R. Checchetto, A. Miotello, R. S. Brusa, Porosity depth profiling of spin-coated silica thin films produced by different precursors sols, *Applied Surface Science*, 255 (2008) 170–173. (IF = 4.439)
- [11] S. Mariazzi, L. Toniutti, **N. Patel**, R. S. Brusa, Formation and escaping of Positronium in porous SiO₂ films at low temperature, *Applied Surface Science*, 255 (2008) 191–193. (IF = 4.439)
- [12] **N. Patel**, A. Kale, P. Mosaner, R. Checchetto, A. Miotello, G. Das, Deuterium thermal desorption from Ni-rich deuterated Mg thin films, *Renewable Energy*, 33 (2008) 232–236. (IF = 4.900)
- [13] A. Majumdar, G. Das, **N. Patel**, P. Mishra, D Ghose, R. Hippler, *Microstructural and Chemical evolution of -CH₃ incorporated (low k) SiCO(H) films prepared by dielectric barrier discharge plasma*, *Journal of Electrochemical Society*, 155 (2008) D22-D28. (IF = 3.662)
- [14] R. Dholam, **N. Patel**, M. Adami, A. Miotello, Physically and chemically synthesized TiO₂ composite thin films for hydrogen production by photocatalytic water splitting, *International Journal of Hydrogen Energy* 33 (2008) 6896-6903. (IF = 4.229)
- [15] R. Fernandes, **N. Patel**, A. Miotello, M. Filippi, Studies on catalytic behavior of Co-Ni-B in hydrogen production by hydrolysis of NaBH₄, *Journal of Molecular Catalysis A: Chemical* 298 (2009) 1–6. (IF = 4.36)
- [16] **N. Patel**, R. Fernandes, A. Miotello, Hydrogen generation by hydrolysis of NaBH₄ with efficient Co-P-B catalyst: A kinetic study, *Journal of Power Sources* 188 (2009) 411–420. (IF = 6.945)

- [17] R. Fernandes, **N. Patel**, A. Miotello, Efficient catalytic properties of Co–Ni–P–B catalyst powders for hydrogen generation by hydrolysis of alkaline solution of NaBH₄, *International Journal of Hydrogen Energy* 34 (2009) 2893-2900. (IF = 4.229)
- [18] R. Fernandes, **N. Patel**, A. Miotello, Hydrogen generation by hydrolysis of alkaline NaBH₄ solution over Cr-promoted Co-B amorphous catalyst *Applied Catalysis B: Environmental*, 92 (2009) 68-74. (IF = 11.698)
- [19] R. Checchetto, **N. Patel**, A. Miotello, R. S. Brusa, Nanolayers on nanochannels for hydrogen purification, *Journal of Applied Physics* 105 (2009) 034502 (This article was selected for the virtual *Journal of Nanoscience and technology published by AIP, Vol. 19 Issue 7 (2009)*). (IF = 2.068)
- [20] R. Dholam, **N. Patel**, M. Adami, A. Miotello, Hydrogen production by photocatalytic water splitting using Cr- or Fe-doped TiO₂ composite thin films photocatalyst, *International Journal of Hydrogen Energy* 34 (2009) 5337-5346 (This article was listed in top 10 most downloaded articles for the consecutive three months July- September 2009). (IF = 4.229)
- [21] R. Fernandes, **N. Patel**, R. Dholam, M. Adami, A. Miotello, Low energy ion-beam modification of TiO₂ photocatalyst thin film for visible light absorption, *Surface & Coatings Technology* 203 (2009) 2579–2583. (IF = 2.589)
- [22] **N. Patel**, R. Fernandes, G. Guella, A. Miotello, Nanoparticle-assembled Co-B thin film for the hydrolysis of ammonia borane: A highly active catalyst for hydrogen production, *Applied Catalysis B: Environmental*, 95 (2010) 137–143. (IF = 11.698)
- [23] **N. Patel**, R. Fernandes, N. Bazzanella, A. Miotello, Co–P–B catalyst thin films prepared by electroless and pulsed laser deposition for hydrogen generation by hydrolysis of alkaline sodium borohydride: A comparison, *Thin Solid Films* 518 (2010) 4779–4785. (IF = 1.939)
- [24] **N. Patel**, R. Fernandes, A. Miotello, Promoting effect of transition metal-doped Co–B alloy catalysts for hydrogen production by hydrolysis of alkaline NaBH₄ solution, *Journal of Catalysis*, 271 (2010) 315–324. (IF = 6.759)
- [25] R. Dholam, **N. Patel**, A. Santini, A. Miotello, Efficient ITO/Cr-doped-TiO₂ multilayer thin films for hydrogen production by photocatalytic water-splitting, *International Journal of Hydrogen Energy*, 35 (2010) 9581-9590. (IF = 4.229)
- [26] **N. Patel**, A. Miotello, V. Bello, Pulsed Laser Deposition of Co-nanoparticles embedded on B-thin film: A catalyst produced by a single-step process to substitute precious metals. *Applied Catalysis B: Environmental*, 103 (2011) 31-38. (IF = 11.698)
- [27] R. Dholam, **N. Patel**, A. Miotello, Hydrogen production by photocatalytic water-splitting using ITO/V-doped-TiO₂ multilayer thin films under visible light, *International Journal of Hydrogen Energy*, 36 (2011) 6519-6528. (IF = 4.229)
- [28] **N. Patel**, R. Fernandes, A. Santini, A. Miotello, Dehydrogenation of NaBH₄ solution using carbon supported Co-B nanoparticles-assembled film catalyst synthesized by Pulsed Laser Deposition, *Catalysis Today*, 170 (2011) 20– 26. (IF = 4.667)
- [29] R. Fernandes, **N. Patel**, A. Miotello, R. Jaiswal, D.C. Kothari, Stability, durability, and reusability studies on transition metal-doped Co-B alloy catalysts for hydrogen production, *International Journal of Hydrogen Energy*, 36 (2011) 13379-3391. (IF = 4.229)
- [30] **N. Patel**, A. Kale, A. Miotello, Improved dehydrogenation of ammonia borane over Co-P-B coating on Ni: A single catalyst for both hydrolysis and thermolysis, *Applied Catalysis B: Environmental*, 111 (2012) 178-184. (IF = 11.698)
- [31] R. Fernandes, **N. Patel**, A. Miotello, R. Jaiswal, D.C. Kothari, Dehydrogenation of Ammonia Borane over transition metal-doped Co-B alloy catalysts, *International Journal of Hydrogen Energy*, 37 (3) (2012) 2397-2406. (IF = 4.229)
- [32] **N. Patel**, R. Fernandes, A. Santini, A. Miotello, Carbon supported Co-B nanoparticles-assembled film catalyst synthesized by Pulsed Laser Deposition for hydrolysis of Ammonium Borane, *International Journal of Hydrogen Energy*, 37(2), (2012) 2007-2013. (IF = 4.229)

- [33] A Santini, N Bazzanella, **N Patel**, G Scarduelli, A Miotello, Growth of Pb-nanowires in one single process by co-sputtering of Al–Pb targets, *Surface and Coatings Technology*, 206 (13) (2012) 3104-3108. (IF = 2.906)
- [34] T Warang, **N Patel**, A Santini, N Bazzanella, A Kale, A Miotello, Pulsed laser deposition of Co₃O₄ nanoparticles assembled coating: Role of substrate temperature to tailor disordered to crystalline phase and related photocatalytic activity in degradation of methylene blue. *Applied Catalysis A: General*, 423 (2012) 21-27. (IF = 4.521)
- [35] **N Patel**, R Fernandes, R Edla, PB Lihitkar, DC Kothari, A Miotello, Superior hydrogen production rate by catalytic hydrolysis of ammonia borane using Co-B nanoparticles supported over mesoporous silica particles. *Catalysis Communications*, 23, (2012) 39-42 (IF = 3.463)
- [36] R Jaiswal, **N Patel**, DC Kothari, A Miotello, Improved visible light photocatalytic activity of TiO₂ co-doped with Vanadium and Nitrogen. *Applied Catalysis B: Environmental*, 126, (2012) 47-54. (IF = 11.698)
- [37] R Fernandes, **N Patel**, A Miotello, L Calliari, Co–Mo–B–P alloy with enhanced catalytic properties for H₂ production by hydrolysis of ammonia borane. *Topics in Catalysis*, 55 (14-15) (2012) 1032-1039. (IF = 2.486)
- [38] A Santini, N Bazzanella, **N Patel**, A Miotello, Synthesis of Lead Nanowires in a Single Co-Sputtering Deposition Step. *Journal of nanoscience and nanotechnology*, 12 (11), (2012) 8759-8763. (IF = 1.556)
- [39] A Bhogale, **N Patel**, P Sarpotdar, J Mariam, PM Dongre, A Miotello, Systematic investigation on the interaction of bovine serum albumin with ZnO nanoparticles using fluorescence spectroscopy. *Colloids and Surfaces B: Biointerfaces* 102, (2013) 257-264. (IF = 3.997)
- [40] R Jaiswal, **N Patel**, DC Kothari, A Miotello, Visible light photocatalytic degradation of 4-chlorophenol using vanadium and nitrogen co-doped TiO₂ *American Institute of Physics Conference Series*, 1512, (2013) 280-281
- [41] A Bhogale, **N Patel**, J Mariam, PM Dongre, A Miotello, DC Kothari, Study of interaction of ZnO nanoparticles with human serum albumin using fluorescence spectroscopy. *American Institute of Physics Conference Series*, 1512, (2013) 130-131.
- [42] S Gupta, **N Patel**, R Fernandes, DC Kothari, A Miotello, Co-B nanoparticles supported over FSM type mesoporous silica: An efficient nanocatalyst for hydrogen production by hydrolysis of ammonia borane. *American Institute of Physics Conference Series*, 1512, (2013) 284-285
- [43] R Fernandes, **N Patel**, A Paris, L Calliari, A Miotello, Improved H₂ production rate by hydrolysis of Ammonia Borane using quaternary alloy catalysts. *International Journal of Hydrogen Energy*, 38 (8) (2013) 3313-3322. (IF = 4.229)
- [44] T Warang, **N Patel**, R Fernandes, N Bazzanella, A Miotello, Co₃O₄ nanoparticles assembled coatings synthesized by different techniques for photo-degradation of methylene blue dye. *Applied Catalysis B: Environmental*, 132, (2013) 204-211. (IF = 11.698)
- [45] A Miotello, **N Patel**, Pulsed laser deposition of cluster-assembled films for catalysis and the photocatalysis relevant to energy and the environment. *Applied Surface Science*, 278, (2013) 19-25. (IF = 4.439)
- [46] **N Patel**, R Fernandes, S Gupta, R Edla, DC Kothari, A Miotello, Co-B catalyst supported over mesoporous silica for hydrogen production by catalytic hydrolysis of Ammonia Borane: A study on influence of pore structure. *Applied Catalysis B: Environmental* 140, (2013) 125-132. (IF = 11.698)
- [47] S Gupta, **N Patel**, R Fernandes, DC Kothari, A Miotello, Mesoporous Co–B nanocatalyst for efficient hydrogen production by hydrolysis of sodium borohydride. *International Journal of Hydrogen Energy* 38 (34), (2013) 14685-14692. (IF = 4.229)
- [48] **N Patel**, A Santini, V Bello, G Mattei, A Miotello, Cobalt/cobalt oxide nanoparticles-assembled coatings with various morphology and composition synthesized by pulsed laser deposition. *Surface and Coatings Technology*, 235, (2013) 784-791. (IF = 2.906)

- [49] **N Patel**, W Trupti, R Fernandes, C Cestari, D Avi, N Bazzanella, R Edla, A new apparatus for carbon monoxide oxidation studies performed over thin film catalysts. *Measurement Science and Technology* 24 (12), (2013) 125901. (IF = 1.433)
- [50] A Bhogale, **N Patel**, J Mariam, PM Dongre, A Miotello, DC Kothari, Comprehensive studies on the interaction of copper nanoparticles with bovine serum albumin using various spectroscopies. *Colloids and Surfaces B: Biointerfaces* 113, (2014) 276-284. (IF = 3.997)
- [51] A Bhogale, A Nair, **N Patel**, A Miotello, DC Kothari, Esterase activity of BSA-ZnO nanoparticle complex. *American Institute of Physics Conference Series*, 1591, (2014) 205-206.
- [52] **N Patel**, R Jaiswal, T Warang, G Scarduelli, A Dashora, BL Ahuja, DC Kothari, A Miotello, Efficient photocatalytic degradation of organic water pollutants using V–N-codoped TiO₂ thin films. *Applied Catalysis B: Environmental* 150, (2014) 74-81. (IF = 11.698)
- [53] R Edla, **N Patel**, Z El Koura, R Fernandes, N Bazzanella, A Miotello, Pulsed laser deposition of Co₃O₄ nanocatalysts for dye degradation and CO oxidation. *Applied Surface Science* 302, (2014) 105-108. (IF = 4.439).
- [54] A Dashora, **N Patel**, DC Kothari, BL Ahuja, A Miotello, Formation of an intermediate band in the energy gap of TiO₂ by Cu–N-codoping: First principles study and experimental evidence. *Solar Energy Materials and Solar Cells*, 125, (2014) 120-126. (IF = 5.018)
- [55] Z. El Koura, **N. Patel**, R. Edla, A. Miotello, Multilayer films of Indium Tin Oxide/TiO₂ codoped with Vanadium and Nitrogen for efficient photocatalytic water splitting. *International Journal of Nanotechnology*, 11 (2014) 1017-1027.
- [56] **Nainesh Patel**, Antonio Miotello, Progress in Co-B related catalyst for hydrogen production by hydrolysis of Boron-hydrides: A review and the perspectives to substitute noble metals. *International Journal of Hydrogen Energy* 40 (2015) 1429-1464. (IF = 4.229)
- [57] R. Fernandes, **N. Patel**, R. Edla, N. Bazzanella, D.C. Kothari, A. Miotello Ruthenium nanoparticles supported over carbon thin film catalyst synthesized by Pulsed Laser Deposition for hydrogen production from Ammonia Borane. *Applied Catalysis A: General* 495, (2015) 23-29. (IF = 4.521)
- [58] Suraj Gupta, **Nainesh Patel**, Antonio Miotello, and Dushyant Kothari. Cobalt-Boride: an Efficient and Robust Electrocatalyst for Hydrogen Evolution Reaction, *Journal of Power Sources* 279 (2015) 620-625 (IF = 6.995).
- [59] R. Jaiswal, J. Bharambe, **N. Patel**, A. Dashora, D.C. Kothari and A. Miotello Copper and Nitrogen codoped TiO₂ photocatalyst with enhanced optical absorption and catalytic activity. *Applied Catalysis B: Environmental* 168-169, (2015) 333-341. (IF = 11.698)
- [60] R. Edla, **N. Patel**, M. Orlandi, N. Bazzanella, V. Bello, C. Maurizio, G. Mattei, P. Mazzoldi, A. Miotello, Highly photo-catalytically active hierarchical 3D porous/urchin nanostructured Co₃O₄ coating synthesized by Pulsed Laser Deposition. *Applied Catalysis B: Environmental* 166–167, (2015) 475–484. (IF = 11.698)
- [61] Enrico Binetti, Zakaria El Koura, **Nainesh Patel**, Alpa Dashora and Antonio Miotello, Rapid hydrogenation of amorphous TiO₂ to produce efficient H-doped anatase for photocatalytic water splitting. *Applied Catalysis A: General* 500, (2015) 69-73. (IF = 4.521)
- [62] **N. Patel**, Alpa Dashora, R. Jaiswal, R. Fernandes, M. Yadav, D. C. Kothari, B. L. Ahuja, and A. Miotello. Experimental and Theoretical Investigations on the Activity and Stability of Substitutional and Interstitial Boron in TiO₂ Photocatalyst *Journal of Physical Chemistry C* 119, (2015), 18581–18590 (IF 4.484).
- [63] A Yadav, **N Patel**, A Miotello, DC Kothari. Stress induced growth of Sn nanowires in a single step by sputtering method. *SOLID STATE PHYSICS: Proceedings of the 59th DAE Solid State Physics Symposium*, 1665 (2015) 050098.
- [64] UV Patil, Niranjana S Ramgir, AK Debnath, DK Aswal, SK Gupta, S Gupta, **N Patel**, DC Kothari. Room temperature NH₃ sensing properties of Co-B-PANI nanocomposite films. *Physics and Technology of Sensors, IEEE*, (2015) 19-21.
- [65] R. Jaiswal, **N. Patel**, Alpa Dashora, R. Fernandes, M. Yadav, R. Edla, R.S. Varma, D.C. Kothari, B.L. Ahuja, A. Miotello. Efficient Co-B-codoped TiO₂ Photocatalyst for Degradation of Organic

- Water Pollutant under Visible Light. *Applied Catalysis B: Environmental* 183, (2016) 242-253. (IF = 11.698)
- [66] A Mazzi, N Bazzanella, M Orlandi, R Edla, **N Patel**, R Fernandes, A Miotello. Physical vapor deposition of mixed-metal oxides based on Fe, Co and Ni as water oxidation catalysts. *Materials Science in Semiconductor Processing* 42, (2016) 155-158. (IF = 2.359)
- [67] S. Gupta, **N. Patel**, R. Fernandes, R. Kadrekar, Alpa Dashora, A.K. Yadav, D. Bhattacharyya, S.N. Jha, A. Miotello and D.C. Kothari, Co-Ni-B nanocatalyst for efficient hydrogen evolution reaction in wide pH range, *Applied Catalysis B: Environmental* 192 (2016) 126–133. (IF = 11.698)
- [68] R Edla, S Gupta, **N Patel**, N Bazzanella, R Fernandes, DC Kothari, A Miotello. Enhanced H₂ production from hydrolysis of sodium borohydride using Co₃O₄ nanoparticles assembled coatings prepared by pulsed laser deposition. *Applied Catalysis A: General* 515 (2016) 1–9. (IF = 4.521)
- [69] RS Varma, N Thorat, R Fernandes, DC Kothari, **N Patel**, A Miotello Dependence of photocatalysis on charge carrier separation in Ag-doped and decorated TiO₂ nanocomposites. *Catalysis Science & Technology* 6 (24), (2016) 8428-8440 (IF = 5.365)
- [70] Zakaria El Koura, Massimo Cazzanelli, Nicola Bazzanella, **Nainesh Patel**, Rohan Fernandes, Georgios A Arnaoutakis, Anna Gakamsky, Andrew Dick, Alberto Quaranta, Antonio Miotello. Synthesis and Characterization of Cu and N Co-Doped RF-Sputtered TiO₂ Films: Photoluminescence Dynamics of Charge Carriers Relevant for Water Splitting. *The Journal of Physical Chemistry C* 120 (2016) 12042–12050. (IF = 4.484)
- [71] H Jadhav, AK Singh, **N Patel**, R Fernandes, S Gupta, DC Kothari, A Miotello, S Sinha Pulsed laser deposition of nanostructured Co-B-O thin films as efficient catalyst for hydrogen production *Applied Surface Science* 387, (2016) 358-365. (IF = 4.439)
- [72] Michele Orlandi, Nicola Dalle Carbonare, Stefano Caramori, Carlo Alberto Bignozzi, Serena Berardi, Alberto Mazzi, Zakaria El Koura, Nicola Bazzanella, **Nainesh Patel**, Antonio Miotello. Porous versus compact nanosized Fe (III) based water oxidation catalyst for photoanodes functionalization *ACS Applied Materials & Interfaces*. 8, (2016) 20003-20011. (IF = 8.097)
- [73] Michele Orlandi, Alberto Mazzi, Giacomo Arban, Nicola Bazzanella, Paolo Rudatis, Stefano Caramori, **Nainesh Patel**, Rohan Fernandes, Carlo A Bignozzi, Antonio Miotello, On the effect of Sn-doping in hematite anodes for oxygen evolution. *Electrochimica Acta* 214 (2016) 345-353. (IF = 5.116)
- [74] A Yadav, Alpa Dashora, **N Patel**, A Miotello, M Press, DC Kothari. Study of 2D MXene Cr₂C material for hydrogen storage using density functional theory. *Applied Surface Science* 389, (2016) 88-95. (IF = 4.439)
- [75] Synthesis and Characterization of Cu and N Codoped RF-Sputtered TiO₂ Films: Photoluminescence Dynamics of Charge Carriers Relevant for Water Splitting Z El Koura, M Cazzanelli, N Bazzanella, **N Patel**, R Fernandes, GE Arnaoutakis, A Gakamsky, A Dick, A Quaranta, A Miotello, *The Journal of Physical Chemistry C* 120 (22), (2016) 12042-12050. (IF = 4.484)
- [76] S Gupta, **N Patel**, R Fernandes, S Hanchate, A Miotello, DC Kothari, Co-Mo-B Nanoparticles as a non-precious and efficient Bifunctional Electrocatalyst for Hydrogen and Oxygen Evolution, *Electrochimica Acta* 232, (2017) 64-71. (IF = 5.116)
- [77] J Jessy P, M Shalini, **N Patel**, P Sarawade, S Radha Thermo optical study of nematic liquid crystal doped with ferrofluid, *AIP Conference Proceedings* 1837 (1), (2017) 040066
- [78] A Yadav, AS Gangan, B Chakraborty, LM Ramaniah, **N Patel**, M Yadav, A Dashora, DC Kothari, M Press Interaction of TiO₂ nanocluster with graphene oxide: Experimental and theoretical investigations *AIP Conference Proceedings* 1832 (1), (2017) 120031.
- [79] Raju Edla, Andrea Tonezzer, Michele Orlandi, **Nainesh Patel**, Rohan Fernandes, Nicola Bazzanella, Kalyani Date, DC Kothari, Antonio Miotello, 3D Hierarchical Nanostructures of Iron Oxides coatings prepared by Pulsed laser deposition for Photocatalytic Water Purification, *Applied Catalysis B: Environmental* 219 (2017) 401–411. (IF = 11.698)
- [80] Asha Yadav, Brahmananda Chakraborty, Abhijeet Sadashiv Gangan, **Nainesh Patel**, Mehernosh R Press, Lavanya M Ramaniah Magnetic Moment Controlling Desorption Temperature in Hydrogen

- Storage: Case of Zr Doped Graphene as High Capacity Hydrogen Storage Media, *The Journal of Physical Chemistry C* 121 (31), (2017) 16721-16730. (IF = 4.536)
- [81] Manisha Yadav, Asha Yadav, Rohan Fernandes, Yaksh Popat, Michele Orlandi, Alpa Dashora, DC Kothari, Antonio Miotello, BL Ahuja, **Nainesh Patel**, Tungsten-doped TiO₂/reduced Graphene Oxide nano-composite photocatalyst for degradation of phenol: A system to reduce surface and bulk electron-hole recombination *J. of Environmental Management* 203 (2017) 364-374. (IF = 4.005)
- [82] S Gupta, A Yadav, S Bhartiya, MK Singh, A Miotello, A Sarkar, **N Patel**. Co oxide nanostructures for electrocatalytic water-oxidation: effects of dimensionality and related properties. *Nanoscale* 10 (2018) 8806-8819. (IF = 7.233).
- [83] PJ Jessy, S Radha, **Nainesh Patel**. Morphological, optical and dielectric behavior of chiral nematic liquid crystal mixture: Study on effect of different amount of chirality. *Journal of Molecular Liquids* 255 (2018) 215-223. (IF = 4.513).
- [84] Andrea Sartori, Michele Orlandi, Serena Berardi, Alberto Mazzi, Nicola Bazzanella, Stefano Caramori, Rita Boaretto, Mirco Natali, Rohan Fernandes, **Nainesh Patel**, Carlo Alberto Bignozzi, Antonio Miotello. Functionalized p-silicon photocathodes for solar fuels applications: Insights from electrochemical impedance spectroscopy. *Electrochimica Acta* 271, (2018) 472-480. (IF = 5.116)
- [85] Jessy P J, Radha Srinivasan and **Nainesh Patel** Highly improved dielectric behaviour of ferronematic nanocomposite for display application. *Liquids Crystals* (2018) In press (IF = 2.636).
- [86] Ranjana Varma, Manisha Yadav, Kajal Tiwari, Nisha Makani, Suraj Gupta, Dushyant C Kothari, Antonio Miotello, **Nainesh Patel**. Roles of Vanadium and Nitrogen in Photocatalytic Activity of VN-Codoped TiO₂ Photocatalyst. *Photochemistry and Photobiology* 94 (2018) 955-964. (IF = 2.212).
- [87] Yadav, M. Yadav, S. Gupta, Y. Popat, A. Gangan, B. Chakraborty, L. M. Ramaniah, R. Fernandes, A. Miotello, M. R. Press, **N. Patel** Effect of Graphene oxide Loading on TiO₂: Morphological, Optical, Interfacial Charge dynamics—A Combined Experimental and Theoretical study. *Carbon* Accepted (2018) (IF = 7.082).

Book Chapters

- [1] A Miotello, **N Patel**, Nano-cluster Assembled Films, Produced by Pulsed Laser Deposition, for Catalysis and the Photocatalysis, *Chapter in a book titled “Lasers in Materials Science”, Springer*, (2014) 213-225.
- [2] R Fernandes, **N Patel**, DC Kothari, A Miotello, Harvesting Production Clean Using Cobalt-Boride-Based Energy Through H₂ Nanocatalyst, *Chapter in a book titled “Advanced Nanomaterials in Biomedical, Sensor and Energy Applications”, Springer*, (2017) 35.
- [3] A Mazzi, M. Orlandi, **N. Patel**, A. Miotello, Laser-inducing extreme thermodynamic conditions in condensed matter to produce nanomaterials for catalysis and the photocatalysis *Chapter in a book of Springer*, (2017) In Press.

Publications under review

- [1] Y. Popat, M. Orlandi, **N. Patel**, N. Bazzanella, S. Gupta, R. Edla, M. Yadav, S. Pillai, M.K. Patel, A. Miotello. “CoFe₂O₄/CoO hierarchical-type nanostructured coatings prepared by Pulsed Laser Deposition: enhanced photocatalysis by Z-scheme design. Submitted to *Applied Catalysis B: Environmental* (2018) (IF = 11.698).
- [2] Jessy P J, V. Bambole, RR Deshmukh and **Nainesh Patel**. Effect of nickel zinc ferrite magnetic nanoparticles on a blue phase cholesteric liquid crystal. Submitted to *Journal of Molecular Liquids* (2018). (IF = 4.513).

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