



Dr. Rajender Kumar

Associate Professor

**Contact
Details:**

Department of Chemistry and
Chemical Sciences
Central University of Himachal
Pradesh, Temporary Academic
Block, Shahpur, Dist.- Kangra,
HP-176206 India.

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Academic Qualification:

PhD, Chemistry, Indian Institute of Technology
Roorkee. (2010)

M.Sc Chemistry, Himachal Pradesh University
Shimla-05 (2005)

B.Sc , Chemistry, Botany, Zoology, Himachal
Pradesh University, Shimla-05 (2003)

Positions Held:

- 1 Associate Professor, Department of
Chemistry and Chemical Sciences, Central
University of Himachal Pradesh, Kangra,
H.P, since October 2019.
- 2 Assistant Professor Sardar, Vallabhbbhai
National Institute of Technology Surat-
3 395007 (SVNIT) since December 2013.
- 3 Postdoctoral Fellow, Bengurion
University of Negev Israel. (June 2011-
4 December 2013)
- Assistant Professor, HansRaj College,
University of Delhi, New Delhi. (December
2010-May 2011)

Specialisation:

Analytical Chemistry/ Organic
Chemistry/Biomaterial Chemistry/Organic
Spectroscopy.

Research Interest:

Nanomaterials, Biomaterials,
Bionanofluidics,
Antibiofouling Polymers, Antimicrobial
Peptides, Chiral Separation and Analysis

Publications:

1. Patel, Khushbu; Kushwaha, Prem; Kumar, Shashank; **Kumar, Rajender**, Lysine and α -Aminoisobutyric acid conjugated bio-inspired polydopamine surfaces for the enhanced antibacterial performance of the Foley-catheter, **ACS, Applied Biomaterials**, DOI:10.1021/acsabm.9b00794
2. Yachana Upadhyay, ShilpaBothra, **Rajender Kumar** AshokKumar SK, Suban KSahoo, Mimicking biological process to detect alkaline phosphatase activity using the vitamin B6 cofactor conjugated bovine serum albumin capped CdS quantum dots, **Colloids and Surfaces B: Biointerfaces**, In Press, doi.org/10.1016/j.colsurfb.2019.110624
3. Nimisha Singh, Jyotsnamayee Nayak, Suban K Sahoo, **Rajender Kumar**, Glutathione conjugated superparamagnetic Fe₃O₄-Au core shell nanoparticles for pH controlled release of DOX, **Materials Science and Engineering: C**, 2019,100, 453-465.

4 Nimisha Singh, Fadoua Sallem, Celine
Mirjolet, Thomas Nury, Suban Kumar Sahoo,
Nadine Millot, **Rajender Kumar**, Polydopamine

Iron Oxide Nanoparticles as Multifunctional Nanocarrier for Targeted Prostate Cancer Treatment, **Nanomaterials**, 2019, 9 (2),

138

5. Yachana Upadhyay, Shilpa Bothra, **Rajender Kumar**, Suban K Sahoo; Smartphone-Assisted Colorimetric Detection of Cr³⁺ using Vitamin B6 Cofactor Functionalized Gold Nanoparticles and Its Applications in Real Sample Analyses, **ChemistrySelect**, 2018, 3 6892–6896

6. Yachna Upadhyay, Thangaraj Anand, Lavanya Tilak Babu, Priyankar Paira, Ashok Kumar SK, **Rajender Kumar**, Suban K Sahoo; Combined use of spectrophotometer and smartphone for the optical detection of Fe³⁺ using a vitamin B6 cofactor conjugated pyrene derivative and its application in live cells imaging, **Journal of Photochemistry and Photobiology A Chemistry**, 361, 34–40.

7. Nimisha Singh, Jyotsna Nayak, Khushbu Patel, Suban K Sahoo, and **Rajender Kumar** Electrochemical impedance spectroscopy reveals a new mechanism based on competitive binding between Tris and protein on a conductive biomimetic polydopamine surface, **Physical Chemistry Chemical Physics**

20 (40), 25812-25821

8. Khushbu Patel, Nimisha Singh, Jyoti Yadav, Jyotsna M. Nayak, Suban K Sahoo, Jeevan Lata, Duni Chand, Shashank Kumar and **Rajender Kumar**; Polydopamine films change their physiochemical and antimicrobial properties with a change in reaction conditions, **Physical Chemistry Chemical Physics**, 2018, 20 (8), 5744-5755

9. Yachana Upadhyay, Thangaraj Anand, Lavanya Thilak Babu, Priyanka Paira, Guido Crisponi, Ashok Kumar SK, **Rajender Kumar** and Suban K. Sahoo.; Three-in-one type fluorescent sensor based on a pyrene pyridoxal cascade for the selective detection of Zn(II), hydrogen phosphate and cysteine, **Dalton Trans.**, 2018, 47, 742-749

10. Nimisha Singh, Khushbu Patel, Suban K. Sahoo, **Rajender Kumar**; Human nitric oxide Biomarker as potential NO donor in conjunction with superparamagnetic Iron oxide @ Gold core shell nanoparticles for cancer therapeutics,

Colloids and Surfaces B: Biointerfaces,
2018, 163,
246-256

11. Khushbu Patel, Nimisha Singh, Jyotsna M. Nayak, Babli Jha, Suban K. Sahoo, and **Rajender Kumar**; Environmentally Friendly Inorganic Magnetic Sulfide Nanoparticles for Efficient Adsorption-Based Mercury Remediation from Aqueous Solution, **ChemistrySelect** 2018, 3 (6), 1840- 1851

12. R. Patel, S. Bothra, **Rajender Kumar**, G. Crisponi, Suban K Sahoo, Pyridoxamine driven selective turn-off detection of picric acid using glutathione stabilized fluorescent copper nanoclusters and its applications with chemically modified cellulose strips, **Biosensors and Bioelectronics**, 2018, 102, 196-203.

13. S. Bothra, L. T. Babu, P. Paira, SK Ashok Kumar, **Rajender Kumar** and Suban K Sahoo, A biomimetic approach to conjugate vitamin B6 cofactor with the lysozyme cocooned fluorescent AuNCs and its application in turn-on sensing of zinc(II) in environmental and biological samples, **Analytical and Bioanalytical Chemistry**, 2018, 410 (1), 201-210

14. Nimisha Singh, Khushbu Patel, Jyotsna M Nayak, Jyoti Yadav, Suban K Sahoo, **Rajender Kumar**, A New Methodology for

Detection and Assessment of Nitric Oxide in
Biological Samples, **ChemistrySelect**, 2017,
2, 8483-8485.

15. Bothra, Shilpa; Paira, Priyanka; Kumar, SK;
Kumar, Rajender; Sahoo, Suban K; Vitamin
B6Cofactor-Conjugated

Polyethyleneimine-Passivated Silver
Nanoclusters for Fluorescent Sensing of Zn²⁺
and Cd²⁺ Using Chemically Modified
Cellulose Strips, **ChemistrySelect**, 2017, 2,
6023–6029.

16. Bothra,S.; **Rajender Kumar**, Sahoo,S.K.;
Pyridoxal conjugated gold nanoparticles for
distinct colorimetric detection of
chromium(III) and iodide ions in biological
and environmental fluids **New Journal of
Chemistry** 2017, DOI:
10.1039/C7NJ00350A.

17. Singh,N.; Patel,K.; Sahoo,S.K.;
Pati,R.; **Rajender Kumar.**,
Gastrointestinal tract mechanism of nitrite
capture modeled on the self assembled
monolayer of thioproline for electrochemical
nitrite determination. **Journal of Material
Chemistry A**, 2017, 5, 3389–3403

18. Bothra, S. Upadhyay, Y. **Rajender
Kumar**, Ashok Kumar, S. K. Sahoo, S.
K. Chemically modified cellulose strips with
pyridoxal conjugated red fluorescent gold
nanoclusters for nanomolar detection of

mercuric ions. **Biosensors** and
Bioelectronics

2017, 90, 329–335

19. Upadhyay, Yachana; Bothra, Shilpa; **Kumar, Rajender**; Choi, Heung-Jin; Sahoo, Suban K; Optical sensing of hydrogen sulphate using rhodamine 6G hydrazide from aqueous medium, **Spectrochimica Acta A**, 2017, 180, 44–50.

20. Bothra,S.;Upadhyay,Y.;; **Kumar,Rajender.**; Sahoo,S.K.;; Applications of vitamin B6 cofactor pyridoxal 5'-phosphate and pyridoxal 5'-phosphate crowned gold nanoparticles for optical sensing of metal ions. **Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy** 2017, 174, 1–6

21. Sahoo, S.K.; Sharma,D.; Bothra,S.; Sutapa Mondal,S.; **Kumar,Rajender** .; Kumar, SK.; Nandre,J.; Patil,U.; Callan , J.; Pyridoxal derived chemosensor: Its application in anion sensing and molecular logic gate building. **Indian Journal of Chemistry** 2016, 55 A,

44-50.

22. Sahoo,S.K.;Sharma,D.; Moirangthem,A.;

Kuba,A.;

Thomas,R.;

Kumar,Rajender.;

Kuwar,A.;JinChoi,H.; Basu,A.;Pyridoxal derived chemosensor for chromogenic sensing of Cu²⁺ and fluorogenic sensing of Fe³⁺ in semi-aqueous medium. **Journal of Luminescence** 2016, 172, 297–303.

23. Sharma, D.; Kuba, A.; Thomas, **Kumar, Rajender.**; Choi, H.J.; Sahoo, S. K., An aqueous friendly chemo sensor derived from vitamin B6 cofactor for colorimetric sensing of Cu (2+) and fluorescent turn-off sensing of Fe.(3+) **Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy** 2015, 153, 393-396.

24. Ying, W.; **Kumar, Rajender.**; Herzberg, M.; Kasher, R., Diminished swelling of cross-linked aromatic oligoamide surfaces revealed a new fouling mechanism of reverse-osmosis membranes. **ACS, Environmental science & technology** 2015, 49, 6815–6822.

25. Sharma, D.; Moirangthem, A.;

Kumar, Rajender.; Kumar, S. A.; Kuwar, A.; Callan, J. F.; Basu, A.; Sahoo, S. K.,
Pyridoxal- thiosemicarbazide: its anion sensing ability and application in living cells imaging. **RSC Advances 2015, 5,**

50741-50746.

26. Bothra, S.; Kumar, Rajender.; Kuwar, A.; Singh, N.; Sahoo, S. K., Cu²⁺-driven selective colorimetric sensing of iodide ions and AND logic gate using citrate-capped AgNPs. *Materials Letters* 2015, 145, 34-36.

27. Bothra S, Kumar Rajender, Sahoo SK. Pyridoxal derivative functionalized gold nanoparticles for colorimetric determination of zinc (II) and aluminium (III). *RSC Advances*. 2015;5(118):97690-5.

28. Bothra, S.; Kumar, Rajender.; Pati, R. K.; Kuwar, A.; Choi, H.-J.; Sahoo, S. K., Virgin silver nanoparticles as colorimetric nanoprobes for simultaneous detection of iodide and bromide ion in aqueous medium. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy* 2015, 149, 122-126.

29. Kumar, Rajender.; Martens, J.; Bhushan, R., Enantiomerization Study of

Atropine and its Semipreparative
Enantioseparation along with (1 RS, 2 SR)-
(±)-Ephedrine on Polyacrylamide Column
Using High-

Performance Liquid Chromatography.
**Journal of Liquid Chromatography &
Related Technologies 2015, 38,**
(1), 111-116.

30. Kumar, Rajender.;
Bhushan, Ravi., Indirect chiral ligand
exchange chromatography for
enantioseparation: a modification of
conventional techniques. **RSC Advances**
2014, 4, (91), 50130- 50136.

31. Bhushan, Ravi.; **Kumar,**
Rajender., Enantioresolution of dl-
penicillamine. **Biomedical**
Chromatography 2010, 24, (1), 66-
82.

32. Bhushan, R.; **Kumar, Rajender.,**
Analysis of
multicomponent mixture and simultaneous
enantioresolution of proteinogenic and
non-proteinogenic amino acids by
reversed-phase high- performance liquid
chromatography using chiral variants of
Sanger's reagent. **Analytical and**
bioanalytical chemistry 2009, 394, (6),
1697-1705.

33. Bhushan, R.; **Kumar, Rajender.**,

Reversed-phase high

performance liquid chromatographic separation of diastereomers of β - amino alcohols and microwave assisted synthesis of Marfey's reagent, its chiral variants and diastereomers. **Journal of Chromatography A** 2009, 1216, (12), 2592-2596.

34. Bhushan, R.; Kumar, Rajender., Analytical and preparative enantioseparation of dl-penicillamine and dl-cysteine by high-performance liquid chromatography on α -acid glycoprotein and β -cyclodextrin columns using ninhydrin as a reversible tagging reagent. **Journal of Chromatography A** 2009, 1216, (15), 3413-3417.

35. Bhushan, R.; Kumar, Rajender., Comparative application of microwave, ultrasonication, ultracentrifugation and conventional heating for preparation of sample as dinitrophenyl derivative for direct enantioseparation of certain amino alcohols and 1-amino-2-propanol from vitamin B₁₂ hydrolysate on α 1-acid glycoprotein and β -cyclodextrin columns. **Journal of Chromatography A** 2009, 1216, (45), 7941-7945.

Research Projects Completed/Ongoing:

1. Polydopamine based Nanoparticles with Antimicrobial and antiarsenic properties for water disinfection and Remediation by SERB India for three years 2018-2021 with total cost of Rs. 4430000/- (Rs. Forty- Four Lakh Thirty Thousand Only). As **Principal Investigator Completed.**
2. Functional Variants of Mussel Inspired Biomaterial Surfaces: Effect of Surface Functional Groups Properties. Sanctioned by (2015- under DST Young Scientist Award with Total cost of Rs.28,91,000/- as **Principal Investigator Completed.**
3. Polymer-graphene-antimicrobial protein hybrid composite microspheres as potent biocidal agents with attract and kill protein-metal synergy.' By SERB India for two years 2014-2016 with total cost of Rs. 12,00,000/- as **Principal Investigator Completed.**

MPhil Supervised: M.Sc. Project Thesis

Completed: 14

Ongoing : 03

PhD Supervised:**As Supervisor**

- (1 **Ms. Nimisha Singh:** Biocompatible Nanoparticles for Cancer Drug Delivery and Therapeutics by Facilitating Nitric Oxide Release.
- (2 **Mrs. Khushbu Patel:** Design of Hybrid polymeric surfaces with anti- biofouling properties and their application in biomedicine and environment. (Viva Voce awaited)

As Co-Supervisor

1. **Ms. Yachana Upadhyay:** Vitamin B6 Co-factors conjugated fluorogenic and chromogenic probes for the detection of bioactive metal ions and alkaline phosphatase. (Viva Voce Awaited)

As Supervisor**PhD Supervising:**

1. **Ms. Jyotsna M Nayak:** Development of Biodegradable Polymeric films with antibiofouling Properties.
2. **Mr. Anuj Saini:** Development of Chiral Molecularly Imprinted Polymers for Stereospecific Molecular recognition for Biomedical Applications.
3. **Mr. Seshu Vardhan:** Development of biocompatible nanodrug delivery vehicles for cancer chemotherapeutics.

Participation in Seminars/Conferences:

1. Invited Talk on "Quartz Crystal Microbalance with Dissipation Monitoring Studies on Swelling and Fouling Mechanism using Crosslinked Aromatic Polyamide Mimetic of Reverse Osmosis Membranes" Delivered at

- International Conference
“Harnessing Engineering and
Technology for Innovation and
Sustainability–HETIS-2014” from Sep
19-20, 2014 at Chandigarh.
2. An Invited Talk on “Quartz Crystal
Microbalance with Dissipation
Monitoring and its Applications” at
workshop on Advanced Scientific
Tools for Materials Science and
Technology (ASTMST 2015) held
from 28-31 May 2015 at SVNIT
Surat.
 3. Gold-coated Oligoamide Mimetic of
Thin Film Composite Membrane
Synthesized using Layer Chemistry for
Study of Adsorption of foulants and
surfactants, Rajender Kumar* and Roni
Kasher *Oral presentation at North
American Membrane Society
Conference 2012 held at New Orleans
from 9-13 June 2012
 4. Gold-coated Oligoamide Mimetic of
Thin Film RO and NF Membranes
Synthesized by Covalent Layer
Chemistry for Adsorption Studies of
Organic Foulants and Surfactants,
Rajender Kumar and Roni Kasher *
Presented at symposium “From
Molecules to Materials:

**Advances and Challenges” held at the
David Lopatie Conference**

Centre, Weizmann Institute of
Science on July 15–16, 2012

5. Direct analytical and Preparative Separation of Enantiomers of Ephedrine and Atropine by Reversed-Phase High-Performance Liquid Chromatography Using Polyacrylamide Column and Photodiode Array Detection, R Bhushan and Rajender Kumar

***Presented at 21st
International Symposium on
Pharmaceutical and Biomedical
Analysis From 11-14 October 2009
at Orlando, Florida, USA.**

**Membership of Learned
Societies/ Professional
Bodies:**

Awards & Honours Received:

Life member of Indian Society of Analytical Scientists.

1. Awarded Postdoctoral Fellowship by Israel Ministry of Science and Higher Education. 2012-2013
2. Awarded Visiting Scholar Fellowship by Centre for International Mobility Finland under Finnish Government Scholarship Pool to work at Laboratory of Analytical Chemistry, University of Helsinki for Academic Year 2011-2012
3. Awarded Post-Doctoral Fellowship by Blaustein Centre for Scientific

Cooperation (Israel) For 2011-2012.

4. Awarded Postdoctoral Fellowship by Israel Government under VATAT Programme for 2011-2012.
5. Nominated by the University Grant Commission, New Delhi, to Visit Finland as a Visiting Scholar under Finnish Government Scholarship Pool for the Academic Year 2010- 2011.
6. Awarded International Travel Grant by Department of Science and Technology, Govt. of India for Attending 21st International Symposium on Pharmaceutical and Biomedical Analysis from 11-14 October 2009 at Orlando, Florida, USA.
7. CSIR-SRF-2009 awarded by Council of Scientific and Industrial Research New Delhi (INDIA).
8. CSIR-JRF-NET-2006 awarded by Council of Scientific and Industrial Research New Delhi (INDIA).
9. Graduate Aptitude Test in Engineering (GATE)-2006 with Score of 95 Percentile and All India Rank of 213.

Others:

- 1 Organised Five-day TEQIP Sponsored Five-day workshop as Cordinator on Sophisticated Analytical techniques in Surface Chemistry (SATSC)-2016 from

23 September -2016.