

1. Name: **Dr. Pankaj Srivastava**

2. Designation: **Professor**

3. Email and contact information
Lab No. 40, Department of Chemistry,
Institute of Science, Banaras Hindu University,
Varanasi - 221005, India

Telephone: +91-9415624787 (BSNL GSM mobile)
+91-542-6701361(O) 2481(Lab)

E-mail: pankaj@bhu.ac.in; pankaj_bhuin@rediffmail.com

Fax: +91-542-2368127



4. Gender: Male

5. Category: GEN

6. Date of birth: 16.09.1972

7. Academic Qualifications

Sr.	Degree	Institution	Year
1	B. Sc.	Banaras Hindu University	1992
2	M.Sc.	Banaras Hindu University	1994
3	Ph.D.	Banaras Hindu University	2000

8. Area of Specialization

Broad Subject area of Teaching: Physical Chemistry

Current Research Field

<u>Broad</u>	Electrochemistry
<u>Specific</u>	Photoelectrochemical Solar Cells (Fabrication of modular Dye-sensitized Solar Cells, DSSC)

The current research in our lab is focused on to develop stable and low-cost dye-sensitized solar cells (DSSC). This involves developing novel routes for synthesizing nanocrystalline semiconductor(s) and casting their thin films, use of electrolytes (additives) and characterizing new compound(s) as photo-sensitizers. Different classes of compounds being tested are synthetic metal complexes, metal free organic dyes and natural dyes. The significant success for developing stable and efficient solar cells came from encouraging results obtained with the use of rare earth-doped TiO₂ and green synthesis of TiO₂ nanoparticles using natural extract for their DSSC application. The other components of ongoing investigations are the use of pervoskites, ionic liquids and polymers in DSSC.

9. Projects Undertaken as PI/ Co PI

Funding Agency	Title	Duration	Total Cost (Rs. in Lakh)
DST	Regenerative dye-sensitized photoelectrochemical solar cells based on nanocrystalline wide band-gap semiconductor thin film electrodes	2005-2008	8.16
CSIR	Graphene-transition metal mixed oxide hybrid materials for bifunctional electrocatalysis	2014-2017	9.0

10. Awards/Fellowships/Recognitions if any
Being the recipient of
 - Merit Scholarship by the Director, Higher Education, U.P.
 - B.H.U. Merit Research Scholarship, CSIR SRF & CSIR RA fellowships
 - DST Fast Track Young Scientists Scheme Project
11. Patents
 1. U.S. Patent No. US 2016/0055984 A1: "p-toluenesulfonate doped polypyrrole/carbon composite electrode and a process for the preparation thereof"
12. Publications
 1. Hydrothermal synthesized Nd-doped TiO₂ with Anatase and Brookite phases as highly improved photoanode for dye-sensitized solar cell, Neetu, Shalini Singh, [Pankaj Srivastava](#) and Lal Bahadur, J Solar Energy, 208 (2020) 173-181
 2. Synthesis of nanosized TiO₂ using different molecular weight polyethylene glycol (PEG) as capping agent and their performance as photoanode in dye-sensitized solar cells, Shalini Singh, Ishwar Chandra Maurya, [Pankaj Srivastava](#) and Lal Bahadur, Journal of Solid State Electrochemistry 24 (2020) 2395–2403
 3. Effect of dye extracting solvent on the photovoltaic performance of Tecoma stans sensitized solar cells, Shalini Singh, Ishwar Chandra Maurya, Shubham Sharma, S Krishnamoorthi, [Pankaj Srivastava](#) and Lal Bahadur, Journal of Electronic Materials 49 (2020) 4355–4363
 4. Vat Dye Safranin O and Perylene Based Conjugated Donor-Acceptor Polyimide as Sensitizer for Dye-Sensitized Solar Cells, Ekta Sonker, Rudramani Tiwari, Shalini Singh, Krishna Kumar, [Pankaj Srivastava](#), S Krishnamoorthi, Energy Fuels 34 (2020) 14527–14534
 5. Green synthesis of TiO₂ nanoparticles using Bixa orellana seed extract and its application for solar cells, Ishwar Chandra Maurya, Shalini Singh, Sudipta Senapati, [Pankaj Srivastava](#) and Lal Bahadur, Solar Energy; 194 (2019) 952-958
 6. Preparation, Characterization and Photosensitizing Activities of Homoleptic Cu(II) Dithiocarbamates in TiO₂ based DSSC; Krishna K. Manar; Neetu Neetu; Kavita Kumari; Anamika Anamika; Chote Lal Yadav; [Pankaj Srivastava](#); Michael G. B. Drew; Nanhai Singh, ChemistrySelect, 4, 37 (2019) 11140-11148
 7. Natural dye extract from Cassia Fistula and its application in dye-sensitized solar cell: experimental and density functional theory studies, Ishwar Chandra Maurya, Shalini Singh, [Pankaj Srivastava](#), Biswajit Maiti and Lal Bahadur, Optical Materials; 90 (2019) 273–280
 8. New homoleptic d¹⁰ metal complexes containing ferrocenyl functionalized dithiocarbamates as sensitizers for high efficiency TiO₂ based dye-sensitized solar cells, Neetu, Krishna K. Manar, [Pankaj Srivastava](#), Nanhai Singh, Solar Energy 176 (2018) 312–319
 9. Effect of particle size on the performance of TiO₂ based dye-sensitized solar cells, Ishwar Chandra Maurya, Sudipta Senapati, Shalini Singh, [Pankaj Srivastava](#), Pralay Maiti and Lal Bahadur, ChemistrySelect 3, 34 (2018) 9872 – 9880
 10. Functionalized thermoplastic polyurethane as hole conductor for quantum dot-sensitized solar cell, Sunil Kumar, Ishwar Chandra Maurya, Om Prakash, [Pankaj Srivastava](#), Santanu Das, and Pralay Maiti, ACS Appl. Energy Mater. 1, 9, (2018) 4641-4650

11. A comparative study of electrocatalytic performance of metal molybdates for the water oxidation, V.K.V.P. Srirapu, Ajay Kumar, Nirmala Kumari, [Pankaj Srivastava](#), Ravindra Nath Singh, International Journal of Hydrogen Energy 43 (2018) 16543-16555
12. Dye-sensitized solar cells employing extracts from four Cassia flowers as natural sensitizers: studies on dye ingredient effect on photovoltaic performance, Ishwar Chandra Maurya, Shalini Singh, Neetu, Arun Kumar Gupta, [Pankaj Srivastava](#) and Lal Bahadur, Journal of Electronic Materials 47 (2018) 225-232
13. A new series of heteroleptic Cd(II) diimine-ferrocenyl dithiocarbamate complexes which successfully co-sensitizes TiO₂ photoanode with Ru N719 dye in DSSC, Krishna K. Manar, Neetu, Anamika, [Pankaj Srivastava](#), Michael G. B. Drew and Nanhai Singh, ChemistrySelect, 2, 27 (2017) 8301 – 8311
14. Extensive enhancement in power conversion efficiency of dye-sensitized solar cell by using Al-doped TiO₂ photoanode, Neetu, Ishwar Chandra Maurya, Arun Kumar Gupta, [Pankaj Srivastava](#), Lal Bahadur, J Solid State Electrochem, 21 (2017)1229-1241
15. Ionic liquid integrated polyethylene glycol (PEG) based quasi-solid electrolyte for efficiency enhancement of dye-sensitized solar cell, Reena Kushwaha, [Pankaj Srivastava](#), Lal Bahadur, J Solid State Electrochem 21 (2017)1533-1543
16. Synthesis, crystal structures and photosensitizing activities of Ni(II) and Pd(II) heteroleptic dithiolate–dppf complexes, Krishna K. Manar, Ajit N. Gupta, Arun K. Gupta, Lal B. Prasad, [Pankaj Srivastava](#), Michael G. B. Drew and Nanhai Singh, ChemistrySelect, 2, 9 (2017) 2655-2664
17. N/Al incorporated TiO₂ nanocomposites for improved device performance of a dye-sensitized solar cell, Neetu, Ishwar Chandra Maurya, Shalini Singh, Arun Kumar Gupta, [Pankaj Srivastava](#) and Lal Bahadur, ChemistrySelect, 2, 15 (2017) 4267-4276
18. Enhanced energy conversion efficiency of Na₂CO₃ modified nanostructured TiO₂ photoanode in dye-sensitized solar cell, Arun Kumar Gupta, Ishwar Chandra Maurya, Neetu, Shalini Singh, [Pankaj Srivastava](#) and Lal Bahadur, Energy Environ. Focus 6 (2017) 151–161
19. Dye-sensitized solar cell using extract from petals of male flowers *Luffa cylindrica* L. as a natural sensitizer, Ishwar Chandra Maurya, [Pankaj Srivastava](#) and Lal Bahadur, Optical Materials, 52 (2016) 150–156
20. Nanosized CoWO₄ and NiWO₄ as efficient oxygen-evolving electrocatalysts, V.K.V.P. Srirapu, A. Kumar, [Pankaj Srivastava](#), R.N. Singh, A.S.K. Sinha, Electrochimica Acta 209 (2016) 75–84
21. *Callindra haematocephata* and *Peltophorum pterocarpum* flowers as natural sensitizers for TiO₂ thin film based dye-sensitized solar cells, Ishwar Chandra Maurya, Neetu, Arun Kumar Gupta, [Pankaj Srivastava](#), Lal Bahadur, Optical Materials 60 (2016) 270-276
22. Natural dye extracted from Saraca asoca flowers as sensitizer for TiO₂ based dye-sensitized solar cell, Ishwar Chandra Maurya, Neetu, Arun Kumar Gupta, [Pankaj Srivastava](#) and Lal Bahadur, J. Sol. Energy Eng, SOL-16-1143 (2016) doi:10.1115/1.4034028
23. Improved performance of Ag-doped TiO₂ synthesized by modified sol–gel method as photoanode of dye-sensitized solar cell, Arun Kumar Gupta, [Pankaj Srivastava](#) and Lal Bahadur, J Appl Phys A 122 (2016) 8:724
24. Comparison of Physical and Electrochemical properties of ZnO prepared via different surfactant assisted precipitation route, Arun Gupta, [Pankaj Srivastava](#), Lal Bahadur, Dinesh P. Amalnekar and Ratna Chauhan, Appl Nanosci 5 (2015) 787–794

25. Synthesis and characterization of nitrogen-doped TiO₂ samples and their application as thin film electrodes in dye-sensitized solar cells, Reena Kushwaha, Ratna Chauhan, [Pankaj Srivastava](#), Lal Bahadur, J Solid State Electrochem 19 (2015) 507–517
26. Photocatalytic Activity of TiO₂ synthesized by using different surfactants via precipitation route, Arun Gupta, [Pankaj Srivastava](#), Parag V. Adhyapak, Lal Bahadur and Ratna Chauhan, Journal of Nanoengineering and Nanomanufacturing, 5 (2015) 96-101
27. Enhanced capacitance and stability of p-toluenesulfonate doped polypyrrole/carbon composite for electrode application in electrochemical capacitors, Amit Kumar, Rajiv K. Singh, Hari K. Singh, [Pankaj Srivastava](#), and Ramadhar Singh, Journal of Power Sources 246 (2014) 800-807
28. Mechanism of direct current electrical charge conduction in p-toluenesulfonate doped polypyrrole/carbon composites, Amit Kumar, Rajiv K. Singh, Hari K. Singh, [Pankaj Srivastava](#), and Ramadhar Singh, Journal of Applied Physics 115 (2014) 103702
29. Selective induced polarization through electron transfer in non-polar substrates, A. K. Tewari, P. Srivastava, V. P. Singh, P. Singh, R. Kumar, R. S. Khanna, [Pankaj Srivastava](#), R. Gnanasekaran and P Hobza, New Journal of Chemistry, 38 (2014) 4885-4892
30. Effect of p-toluenesulfonate on inhibition of overoxidation of polypyrrole, Amit Kumar, Rajiv K. Singh, Kushboo Agarwal, Hari K. Singh, [Pankaj Srivastava](#), Ramadhar Singh, J. Appl. Polym. Sci. 130 (2013) 434–442
31. Impact of p-toluenesulfonate on polypyrrole-cobalt catalyst for oxygen reduction reaction, Amit Kumar, Rajiv K. Singh, Kushboo Agarwal, Hari K. Singh, [Pankaj Srivastava](#), Ramadhar Singh, J. Appl. Polym. Sci. 130 (2013) 2645–2651
32. Natural pigments from plants used as sensitizers for TiO₂ based dye-sensitized solar cells, Reena Kushwaha, [Pankaj Srivastava](#), and Lal Bahadur, Journal of Energy, vol. 2013, 2013. doi:10.1155/2013/654953
33. Dye-sensitized solar cell based on nanocrystalline ZnO thin film electrodes combined with a novel light absorbing dye Coomassie Brilliant Blue in acetonitrile solution, [Pankaj Srivastava](#) and Lal Bahadur, International Journal of Hydrogen Energy, 37 (2012) 4863-4870
34. Dc electrical conduction and morphological behavior of counter anion-governed genesis of electrochemically synthesized polypyrrole films, Rajiv K. Singh, Amit Kumar, Khushboo Agarwal, Mahesh Kumar, H. K. Singh, [Pankaj Srivastava](#) and Ramadhar Singh, Journal of Polymer Science Part B: Polymer Physics, 50 (2012) 347–360
35. Improved Performance of 2-imidazolin-5-one as sensitizer at nanocrystalline ZnO thin film electrode in acetonitrile solution, Lal Bahadur and [Pankaj Srivastava](#), Semicond. Sci. Technol. 19 (2004) 531
36. Photoelectrochemical cell based on mixed dye-sensitized nanocrystalline ZnO thin film electrodes in acetonitrile medium, Lal Bahadur and [Pankaj Srivastava](#), J. Electrochem. Soc., 151(11) (2004) G741
37. Spectral sensitization of nanocrystalline n-ZnO thin film electrodes by a new synthetic heterobimetallic complex [Fe(phen)₃] [UO₂(ecda)₂], Lal Bahadur and [Pankaj Srivastava](#), J. New Mat. Electrochem. Syst., 6 (2003) 119
38. Efficient photon-to-electron conversion with Rhodamine 6G-sensitized nanocrystalline n-ZnO Thin film electrodes in acetonitrile solution, Lal Bahadur and [Pankaj Srivastava](#), Sol. Energy Mater. Sol. Cells, 79 (2003) 235