



**Dr. Udaya Kumar Dalimba** (M.Sc Ph.D)

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### **Educational Qualifications**

#### **Ph. D:**

Thesis title: Synthesis and evaluation of optical and electrochemical properties of novel conjugated polythiophenes containing 1,3,4-oxadiazole units.

Thesis supervisor: Prof. A.V. Adhikari, Department of Chemistry, NITK, Surathkal.

**M. Sc:** Mangalore University, India (Specialization: Organic Chemistry) (2000-2002)

**B. Sc:** Vivekananda college, Puttur (1997-2000)

### **Professional Experience**

- May 2018 – Present: Associate Professor, Chemistry, NITK, Surathkal, India.
- Jan. 2008 – May 2018: Assistant Professor, Chemistry, NITK, Surathkal, India.
- Nov.2006 – Dec.2007: Associate Scientific Manager, Syngene Int. Ltd.  
(A Biocon company), Bangalore, India.
- Aug. 2003 – Oct.2006: Senior Research Fellow, Department of Chemistry, NITK, Surathkal, India.
- July 2002 – July 2003: R & D Assistant, JNCASR, Bangalore.
- May-June 2001 & 2002: Summer Research Fellow, JNCASR, Bangalore.

### **Research Interests**

Conjugated molecules/polymers for optoelectronic and photonic applications, Nanomaterials, Organic synthesis and Medicinal chemistry.

### Sponsored research projects

1. Design and Development of Moisture Resistant, Dopant-free Hole-transporting Materials for Perovskite Solar Cells. DST, India under ASEAN-India collaborative R&D scheme. Aug 2021- July 2023. Rs. 33.52 Lakhs. (Ongoing)
2. Design and development of new lubricity improvers for ultra low sulfur diesel. MRPL, India. 12.88492 lakhs. 16.09.2019 to 31.03.2022. (Completed)
3. Efficiency enhancement in organic photovoltaic devices using donor-acceptor conjugated polymers and plasmonic structures. SERB, DST India. March 2014-March 2017. Rs 25 lakhs. (Completed)
4. Design and synthesis of light emitting conjugated copolymers for PLED applications' Under NITK Seed Grant Scheme. Rs. 5 Lakhs. (Completed).

### List of Journal Publications

1. Sruthi H, Udaya Kumar D, Pramod Hegde, Manjunatha M.G, Nandakumar V. Transformation of Refinery Cracked Naphtha Stream into Efficient Lubricity Improvers for Ultra Low Sulphur Diesel. **Journal of Chemical Sciences**, Accepted for publication.
2. Sruthi H, Udaya Kumar D, Pramod K Hegde, Manjunatha M.G, Nandakumar V P. A Simple Method for the Conversion of Light Cracked Naphtha into Efficient Lubricity Improvers for Ultra Low Sulphur Diesel. **ACS Omega**, 2022, 7, 27969-27979.
3. Sruthi H, Udaya Kumar D, Pramod Hegde, Manjunatha M.G, Nandakumar V. Efficient Lubricity Improvers Derived from Methyl Oleate for Ultra Low Sulphur Diesel (ULSD). **Petroleum Chemistry**. Accepted for publication.
4. Viprabha Kakekochi, Da-Wei Kuob, Chin-Ti Chen, Ezequiel Wolcan, Chao-Tsen Chen, and Udaya Kumar Dalimba. A Tale of Two Organic Small Molecular Hole Transporting Materials: Showing Same Extended Shelf-Life but Very Different Efficiency of Inverted MAPbI<sub>3</sub> Perovskite Solar Cells. **Organic Electronics**, 2022, 102, 106428.
5. Nikhil Puthiya Purayil, Viprabha Kakekochi, Udaya Kumar Dalimba, Keloth Chandrasekharan. All-Optical Diode Action Through Enhanced Nonlinear Response from Polymeric Photonic Crystal Microcavity. **ACS Applied Electronic Materials**, 2022, 4, 1, 138–148.
6. Viprabha Kakekochi, Sathish C G, P. P. Nikhil, K Chandrasekharan, Vibhu Darshan, K. N. Narayanan Unni and Udaya Kumar D. Butterfly-Shaped Thiophene-Pyridine Hybrids: Green Electroluminescence and Large Third-Order Optical Nonlinearities. **ChemPlusChem** 2020, 85, 1762–1777.

7. Viprabha Kakekochi, Sathish C.G., Nikhil P P, Keloth Chandrasekharan, Ezequiel Wolcan, **Udaya Kumar D.** Facile synthesis and exploration of excited state assisted two-photon absorption property of D–A–D type thiophene–pyridine derivatives. **Photochemical and Photobiological Sciences.** 2020, 19, 726-736.
8. Viprabha Kakekochi, Nikhil P P, Keloth Chandrasekharan, Udaya Kumar D. Impact of Donor–Acceptor Alternation on Optical Power Limiting Behavior of H–Shaped Thiophene–Imidazo[2,1-b][1,3,4]Thiadiazole Flanked Conjugated Oligomers. **Dyes and Pigments.** 2020, 175, 108181.
9. Rajkumar Reddyrajula and Udaya Kumar D. The bioisosteric modification of pyrazinamide derivatives led to potent antitubercular agents: Synthesis via click approach and molecular docking of pyrazine-1,2,3-triazoles. **Bioorganic and Medicinal Chemistry Letters.** 2020, 30 (2), 126846.
10. Rajkumar Reddyrajula and Udaya Kumar D. Structural Modification of Zolpidem Resulted Potent Anti-TB activity in Imidazo[1,2-*a*]pyridine/pyrimidine-1,2,3-triazoles. **New Journal of Chemistry,** 2019, 43, 16281–16299.
11. Ramu Manjula, Nikhila Gokhale, Sruthi Unni, Prashant Deshmukh, Rajkumar Reddyrajula, M M S Bharath, Udaya Kumar Dalimba, Balasundaram Padmanabhan. Design, synthesis, in-vitro evaluation and molecular docking studies of novel indole derivatives as inhibitors of SIRT1 and SIRT2. **Bioorganic Chemistry,** 2019, 92, 103281.
12. Viprabha K, Udayakumar Dalimba, Nikhil P P, Chandrasekharan K. Effects of substituents on enriching optical limiting action of novel imidazo[2,1-b][1,3,4]thiadiazole fused thiophene based small molecules. **New Journal of Chemistry.** 2019, 43, 9232-9242.
13. Viprabha K, Udaya Kumar D, Nikhil P P, Chandrasekharan K, An investigation on photophysical and third-order nonlinear optical properties of novel thermally-stable thiophene–imidazo [2,1-b][1,3,4] thiadiazole based azomethines. **Dyes and Pigments,** 2019, 167, 216-224.
14. Rajkumar Reddyrajula, Udayakumar Dalimba. Quinoline–1,2,3-triazole hybrids: Synthesis through click reaction, evaluation of antitubercular activity, molecular docking and in-silico ADME studies. **ChemistrySelect,** 2019, 4, 2685-2693.
15. Rajkumar Reddyrajula, Udayakumar Dalimba, Madan Kumar S. Molecular hybridization approach for phenothiazine incorporated 1,2,3-triazole hybrids as promising antimicrobial agents: Design, synthesis, molecular docking and in silico ADME studies. **European Journal of Medicinal Chemistry,** 2019, 168, 263-282.
16. Nikhila Gokhale, Udayakumar Dalimba, Manjunatha Kumsi. Facile synthesis of new indole-pyrimidine hybrids and evaluation of their anticancer and antimicrobial activity. **Journal of Saudi Chemical Society.** 2017, 21, 761-775.

17. Nagabhushana Nayak, Jurupula Ramprasad, Udayakumar Dalimba, Design, synthesis and biological evaluation of new 8-trifluoromethylquinoline containing pyrazole-3-carboxamide derivatives. **Journal of Heterocyclic Chemistry**. 2017, 54, 171-182.
18. Nikhila Gokhale, Naveen Panathur, **Udayakumar Dalimba**, Pawan G. Nayak, K. Sreedhar Ranganath Pai. Novel indole-quinazolinone based amides as cytotoxic agents. **Journal of Heterocyclic Chemistry**, 2016, 53, 513-524.
19. Prashanth Kumar K R, **Udayakumar D**, Siji Narendran N K, Chandrasekharan K and Ritu Srivastava. D-A conjugated polymers containing substituted thiophene, 1,3,4-oxadiazole and non-conjugation linkers: Synthesis and study of optical and electrochemical properties. **Journal of Chemical Sciences**, 2016, 128 (9), 1423-1433.
20. Nagabhushana Nayak, Jurupula Ramprasad, Udayakumar Dalimba, Perumal Yogeeswari, Dharmarajan Sriram, H S Santosh Kumar, S K Peethambar, Rajeshwara Achur. Synthesis of new pyrazole-triazole hybrids by click reaction using a green solvent and evaluation of their antitubercular and antimicrobial activity. **Research on Chemical Intermediates**. 2016, 42, 3721-3741.
21. Nagabhushana Nayak, Jurupula Ramprasad, Udayakumar Dalimba. Synthesis, antitubercular and antibacterial studies of some new quinoline-pyrazole hybrid derivatives. **Journal of Fluorine chemistry**, 2016, 183, 59-68.
22. Nagabhushana Nayak, Ramprasad Jurupula, Udayakumar Dalimba, Perumal Yogeeswari, Dharmarajan Sriram. Synthesis and antimycobacterial screening of new *N*-(4-(5-aryl-3-(5-methyl-1,3,4-oxadiazol-2-yl)-1*H*-pyrazol-1-yl)phenyl)-4-amide derivatives. **Chinese Chemical Letters**. 2016, 27. 365-369.
23. Jurupula Ramprasad, Nagabhushana Nayak, Udayakumar Dalimba, Perumal Yogeeswari and Dharmarajan Sriram. Ionic liquid promoted one-pot synthesis of thiazole-imidazo[2,1-*b*] [1,3,4]thiadiazole hybrids and their antitubercular activity. **MedChemComm**, 2016, 7, 338-344.
24. Naveen Panathur, Nikhila Ghokale, Udayakumar Dalimba, Pulla Venkat Koushik, Perumal Yogeeswari, Dharmarajan Sriram. Synthesis of novel 5-[(1,2,3-triazol-4-yl)methyl]-1-methyl-3*H*-pyridazino[4,5-*b*]indol-4-one derivatives by click reaction and exploration of their anticancer activity. **Medicinal Chemistry Research**. 2016, 25, 135-148.
25. Jurupula Ramprasad, Nagabhushana Nayak and Udayakumar Dalimba. Design of new Phenothiazine-Thiadiazole hybrids via molecular hybridization approach for the development of potent antitubercular agents. **European Journal of Medicinal Chemistry**. 2015, 106, 75-84.

26. Nagabhushana Nayak, Jurupula Ramprasad, Udayakumar Dalimba. New INH-pyrazole analogs: Design, synthesis and evaluation of antitubercular and antibacterial activity. **Bioorganic and Medicinal Chemistry Letters**. 2015, 25, 5540-5545.
27. Jurupula Ramprasad, Nagabhushana Nayak, Udayakumar Dalimba, Perumal Yogeewari, Dharmarajan Sriram. One-pot synthesis of new triazole - imidazo[2,1-*b*][1,3,4]thiadiazole hybrids via Click chemistry and evaluation of their antitubercular activity. **Bioorganic and Medicinal Chemistry Letters**. 2015, 25, 4169–4173.
28. Naveen Panathur, Nikhila Ghokale, Udayakumar Dalimba, Pulla Venkat Koushik, Perumal Yogeewari, Dharmarajan Sriram. New Indole-Isoxazolone derivatives: Synthesis, characterisation and *in vitro* SIRT1 inhibition studies. **Bioorganic and Medicinal Chemistry Letters**. 2015, 25, 2768-2772.
29. Nikhila Gokhale, Naveen Panathur, Udayakumar Dalimba\*, Manjunatha Kumsi. Indole-3-carbinol and 1,3,4-oxadiazole hybrids: Synthesis and study of antiproliferative and antimicrobial activity. **Australian Journal of Chemistry**. 2015, 68, 1603-1613.
30. Jurupula Ramprasad, Nagabhushana Nayak, **Udayakumar Dalimba**, Perumal Yogeewari, Dharmarajan Sriram, S K Peethambar, Rajeshwara Achur, H S Santosh Kumar. Synthesis and biological evaluation of new imidazo[2,1-*b*][1,3,4]thiadiazole-benzimidazole derivatives. **European Journal of Medicinal Chemistry**, 2015, 95, 49-63.
31. Prashanth Kumar K.R, Murali M.G and **D. Udayakumar**. Synthesis and study of optical properties of linear and hyperbranched conjugated polymers containing thiophene and triphenylamine units. **Designed Monomers and Polymers**. 2014, 17 (1), 7-18..
32. Naveen P, **D. Udayakumar**, Venkat K P, Mallika A, Yogeewari P, Sriram D, Vijith Kumar. Identification and characterization of novel indole based small molecules as anticancer agents through SIRT1 inhibition. **European Journal of Medicinal Chemistry**, 2013, 69, 125-138.
33. M.G. Murali, **D. Udayakumar**, Vandana Yadav, Ritu Srivastava. New Thiophene Based Donor-Acceptor Conjugated Polymers Carrying Fluorene or Cyanovinylene Units: Synthesis, Characterization and Electroluminescent Properties. **Polymer Engineering and Science**, 2013, 53 (6) 1161-1170.
34. M.G. Murali, **D. Udayakumar**, Vandana Yadav, Ritu Srivastava, K Safakath. Thiophene based donor–acceptor conjugated polymer as potential optoelectronic and photonic material **Journal of Chemical Sciences**, 2013, 125, (2), 247–257.
35. M.G. Murali, **D. Udayakumar**, Kishore S. Synthesis, characterization, and nonlinear optical properties of donor–acceptor conjugated polymers and polymer/Ag nanocomposites. **Journal of Materials Science**, 2012 (47), 8022-8034.
36. M.G. Murali, P. Naveen, **D. Udayakumar**, Vandana Yadav, Ritu Srivastava. Synthesis and characterization of thiophene and fluorene based donor–acceptor conjugated polymer

- containing 1,3,4-oxadiazole units for light-emitting diodes. **Tetrahedron Letters**, 2012, 53 (2), 157-161.
37. M.G. Murali, M.G. Ramya, **D. Udayakumar**, N.B. Lakshmi, Reji Philip. Synthesis and third order optical nonlinearity studies of the donor-acceptor conjugated polymer, poly(2-[3,4-didodecyloxy-5-(1,3,4-oxadiazol-2-yl)thiophen-2-yl]-5-phenyl-1,3,4-oxadiazole) and a polymer /TiO<sub>2</sub> nanocomposite. **Synthetic Metals**, 2010, 160, 2520-2525.
  38. John Kiran A, Satheesh Rai Nooji, **D. Udayakumar**, ChandrasekharanK, B.Kalluraya, Reji Philip, H.D. Shashikala & A.V. Adhikari. Nonlinear optical properties of p-(N, N-dimethyl)dibenzylideneacetone doped polymer. **Materials Research Bulletin**, 2008, 43, 707-713.
  39. John Kiran A , **D. Udayakumar**, K. Chandrasekharan , A.V Adhikari, Reji Philip, H.D. Shashikala & G. Umesh. Nonlinear Optical Studies of a Newly Synthesized Copolymer Containing Oxadiazole and Substituted Thiophenes. **Optics Communications**, 2007, 271, 236-240.
  40. D. Udayakumar and A.V.Adhikari Synthesis and characterization of novel conjugated copolymers containing 3,4-dialkoxy-thiophene and 1,3,4-oxadiazole units. **European Polymer Journal**, 2007, 43, 3488-3499.
  41. D. Udayakumar, John Kiran A, A.V. Adhikari, Chandrasekharan K, H.D Shashikala Synthesis and nonlinear optical characterization of copolymers containing alternating 3,4-dialkoxythiophene and (1,3,4-oxadiazolyl)benzene units. **Journal of Applied Polymer Science**, 2007, 106, 3033-3039.
  42. D. Udayakumar and A.V.Adhikari, Synthesis and Characterization of Fluorescent Poly(oxadiazole)s containing 3,4-dialkoxythiophenes. **Optical Materials**, 2007, 29, 1710-1718.
  43. D. Udayakumar and A.V.Adhikari, Synthesis and characterization of new light-emitting copolymer containing 1,4-bis(1,3,4-oxadiazolyl)benzene and 3,4-dialkoxythiophenes. **NITK Research Bulletin**, 2006, 15 (1), 30-33.
  44. John Kiran A, D. Udayakumar, K. Chandrasekharan , A.V Adhikari, H.D. Shashikala & G. Umesh Z-scan and Degenerate Four Wave Mixing studies on Newly Synthesized Copolymers Containing Oxadiazole and Substituted Thiophenes. **Journal of Physics B: Atomic, Molecular, and Optical Physics**, 2006, 39, 3747-3756.
  45. D. Udayakumar, John Kiran A, A.Vasudeva Adhikari, Chandrasekharan K, G. Umesh & H.D Shashikala Third Order Nonlinear Optical Studies of Newly Synthesized Polyoxadiazoles Containing 3,4-dialkoxythiophenes using Z-scan and Degenerate Four Wave Mixing Methods. **Chemical Physics**, 2006, 331, 125-130.

46. D. Udayakumar and A.V.Adhikari Synthesis and Characterization of New Light-Emitting Copolymers Containing 3,4-dialkoxythiophenes. **Synthetic Metals**, 2006, 156, 1168-1173.
47. D. Udayakumar, M. Dan and C.N.R Rao. The first amine-templated layered metal selenates. **European Journal of Inorganic Chemistry**, 2004, 1733 – 1739.
48. M. Dan, D. Udayakumar and C.N.R Rao, Transformation of a 4-membered ring zinc phosphate SBU to a sodalite-related 3-dimensional structure through a linear chain structure- **Chem.Commun.**, 2003, 2212-2213.
49. D. Udayakumar and C.N.R. Rao Organically Templated Three-Dimensional Open-framework metal selenites with a diamondoid network. **J. Mater. Chem.** 2003, 13, 1635-1638.
50. A.Choudhury, D. Udayakumar and C.N.R.Rao Three-Dimensional Organically Templated Open-framework Transition Metal Selenites. **Angew. Chem. Int. Ed.** 2002, 41, 158-161.

#### **Conference proceedings**

1. K. Viprabha and D Udaya Kumar. Amelioration of opto – electronic response of thiophene - Imidazo[2,1-b][1,3,4]thiadiazole based organic semiconductors **AIP Conference Proceedings** 2019, 2057, 020030-(1-8).
2. Prashanth Kumar K R, **Udayakumar D**, Siji Narendran N K and Chandrasekharan K. Synthesis and evaluation of optical and electrochemical properties of a new conjugated polymer containing substituted thiophene and non-conjugation linkers. **AIP Conf. Proc.**, 2014, 1620, 371-378.
3. M.G. Murali and **D. Udayakumar**. Design and synthesis of new low band gap organic semiconductors for photovoltaic applications. **SPIE Proceedings** Vol. 8987, 2014
4. M.G. Murali and **D. Udayakumar**. Synthesis and Characterization of a New Donor–Acceptor Conjugated Polymer and Polymer/Ag Nanocomposites. **AIP Conf. Proc.** 2011, 1391, 624-626.

#### **Book:**

1. Thiophene based conjugated polymers for optoelectronic applications  
Polymer light-emitting diodes, polymer solar cells and optical limiters  
Udayakumar Dalimba, Murali M.G. LAP Lambert Academic Publishing (2012). ISBN: 978-3-8473-1740-1.

### **Book Chapters:**

1. Donor-Acceptor Conjugated Polymers and Their Nanocomposites for Photonic Applications. D. Udaya Kumar, A. John Kiran, M. G. Murali and A. V. Adhikari. Nonlinear Optics, In Tech Publishers, Edited by Natalia Kamanina. ISBN 978-953-51-0131-4. February 2012
2. Thiophene based conjugated polymers: synthesis, linear and third order nonlinear optical properties. Murali M. G and Udaya kumar D\* in Advances in Polymer Materials and Technology, Taylor and Francis, Catalog # K25469 ISBN: 9781498718813, CRC press. July 25, 2016. Edited by Anandhan Srinivasan and Sri Bandyopadhyay.

### **Ph.D Guided**

<b>S.No.</b>	<b>Name</b>	<b>Thesis Title</b>	<b>Year</b>
1	Dr. Murali M. G	Synthesis and characterization of thiophene based conjugated polymers for optoelectronic applications	2013
2	Dr. Naveen P	Synthesis, characterization and studies on anticancer activity of some indole derivatives	2015
3	Dr. Prashant Kumar K R	Synthesis and study of optical and electrochemical properties of some heterocyclic conjugated molecules and polymers	2015
4	Dr. Nikhila G	Synthesis, characterization and biological studies of some indole based molecules	2015
5	Dr. Nagabhushan	Synthesis, characterization and antitubercular studies of some pyrazole based molecules	2016
6	Dr. J Ramprasad	Synthesis, characterization and studies on antitubercular activity of some 1,3,4-thiadiazole based molecules	2016
7	Dr. Rajkumar Reddyrajula	Design, synthesis and biological evaluation of novel 1,2,3-triazole based molecules as potent antitubercular agents	2020
8	Dr. Viprabha K	Design, synthesis and investigation on optoelectronic properties of thiophene based heterocycles	2020
9	Dr. Kavyashree S K	New organic and inorganic functional materials for photovoltaic applications: Synthesis, characterization and device performance studies	2022 (as Co-guide)

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