

Dr. Pawan Kumar

Date of Birth : 17 Jan 1991

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Academic Qualifications

Postdoctoral Associate	IISER Kolkata	Jun 2021 – present
Doctor of Philosophy	IISER Kolkata	Jul 2015 – Jun 2021
Supervisor: Prof. Raja Shunmugam		
Project Assistant	IISER Kolkata	Aug 2014 – Jun 2015
5 Year BS-MS Dual Degree Programme	IISER Kolkata	Aug 2009 – Jun 2014
Department of Chemical Sciences		
Higher Secondary (12th)	CBSE	2008
Secondary (10th)	CBSE	2006

Publications

([ORCID: 0000-0003-3429-9840](#))

([Scopus: 57202463325](#))

([Web of Science: C-9261-2018](#))

([Google Scholar Citation Profile](#))

2022

18. Diptendu Patra, **Pawan Kumar**, Dwaipayan Pal, Ipsita Chakraborty and Raja Shunmugam*, “Unique Random-Block Polymer Architecture for Site-specific Mitochondrial Sequestration Aided Effective Chemotherapeutic Delivery and Enhanced Fluorocarbon Segmental Mobility Facilitated ¹⁹F Magnetic Resonance Imaging.” *Biomacromolecules* 2022, . (DOI: [10.1021/ACS.BIOMAC.2C00188](https://doi.org/10.1021/ACS.BIOMAC.2C00188)) (Impact Factor: 6.988) (ISSN No.: 1525-7797)
17. **Pawan Kumar**, Mutyala Naidu Ganivada, Pintu Kanjilal, Rajan Kumar, Raja Shunmugam*, “An efficient clicked degradable template model responsive to encapsulation and release of fluorescent dye.” *Journal of Molecular and Engineering Materials* 2022, 9, 2140003. (DOI: [10.1142/S2251237321400037](https://doi.org/10.1142/S2251237321400037)) (ISSN: No.: 2251-2373)
16. Jyotirlata Singha, Diptendu Patra, **Pawan Kumar** and Raja Shunmugam*, “Highly Efficient Multi-Tasking Porphyrin-Based Chemosensor for Mercury Ions.” *ChemistrySelect* 2022, 7(11), e202104063. (DOI: [10.1002/SLCT.202104063](https://doi.org/10.1002/SLCT.202104063)) (Impact Factor: 2.109) (ISSN: No.: 2365-6549)
15. Diptendu Patra, **Pawan Kumar**, Tapendu Samanta, Ipsita Chakraborty, Rangeet Bhattacharya[#] and Raja Shunmugam*, “Coordinately Tethered Iron (III) Fluorescent Nanotheranostic Polymer Ascertaining Cancer Cell Mitochondria Destined Potential Chemotherapy and T1 Weighted MRI Competency.” *ACS Applied Bio Materials* 2022, 5(3), 1284-1296. (DOI: [10.1021/ACSABM.1C01300](https://doi.org/10.1021/ACSABM.1C01300)) (Impact Factor: 3.250) (Citation = 1) (ISSN: No.: 2576-6422)

14. Diptendu Patra, **Pawan Kumar**, Tapan K. Dash, Ipsita Chakraborty, Rangeet Bhattacharya[#] and Raja Shunmugam*, “Gd(III) Coordinated Theranostic Polymer for Proficient Sequential Targeting-Combinational Chemotherapy and T1 Weighted Magnetic Resonance Imaging.” *ACS Applied Polymer Materials* 2022, 4(3), 1752-1763. (DOI: [10.1021/ACSAPM.1C01591](https://doi.org/10.1021/ACSAPM.1C01591)) (Impact Factor: 4.089) (Citation = 1) (ISSN: No.: 2637-6105)

2021

13. Parvathy Venu, Trong-Nghia Le, **Pawan Kumar**, Diptendu Patra, Rajan Kumar, Cheng-Kang Lee, Vijayakameswara Rao and Raja Shunmugam*, “Efficient Design to Monitor the Site-specific Sustained Release of Non-Emissive Anti-Cancer Drug.” *Chemistry An Asian Journal* 2021, 16, 1-8. (DOI: [10.1002/ASIA.202100355](https://doi.org/10.1002/ASIA.202100355)) (Impact Factor: 4.568) (Citation = 1) (ISSN: No.: 1861-4728)
12. **Pawan Kumar**¹, Pintu Kanjilal¹, Rituparna Das², Tapan K. Dash¹, Manikandan Mohanan¹, Trong-Nghia Le³, N. Vijayakameswara Rao^{3#}, Balaram Mukhopadhyay^{2#} and Raja Shunmugam^{1*}, “1,6-Heptadiynes Based Cyclopolymerization with Mannose Functionalization by Post Polymer Modification for Potential Protein Interaction.” *Carbohydrate Research* 2021, 508, 108397 – 108403. (DOI: [10.1016/J.CARRES.2021.108397](https://doi.org/10.1016/J.CARRES.2021.108397)) (Impact Factor: 2.104) (Citation = 1) (ISSN: No.: 0008-6215)
11. Tapendu Samanta, Narayan Das, Diptendu Patra, **Pawan Kumar**, B Sharmistha and Raja Shunmugam*, “Reaction Triggered ES IPT active water-soluble polymeric probe for potential detection of Hg²⁺/CH₃Hg⁺ in both environmental and biological systems.” *ACS Sustainable Chemistry & Engineering* 2021, 9(14), 5196-5203. (DOI: [10.1021/ACSSUSCHEMENG.1C00437](https://doi.org/10.1021/ACSSUSCHEMENG.1C00437)) (Impact Factor: 7.632) (Citation = 4) (ISSN: No.: 2168-0485)

Till 2020

10. RaviPrakash Magisetty¹, **Pawan Kumar**³, Anuj Shukla², Raja Shunmugam^{3*} and Balasubramanian Kandasubramanian^{1*}, “Intrinsically Conductive Conjugated 1,6-heptadiynes and its Derivatives for Molecular Electronics: Future Moletronics.” *European Polymer Journal* 2020, 124, 109467. (Impact Factor: 4.598) (Citation = 9) (DOI: [10.1016/J.EURPOLYMJ.2019.109467](https://doi.org/10.1016/J.EURPOLYMJ.2019.109467)) (ISSN: No.: 0014-3057) [2020]
9. **Pawan Kumar**¹, Praksah M. Gore², RaviPrakash Magisetty², Mutyala Naidu Ganivada¹, Balasubramanian Kandasubramanian^{2*} and Raja Shunmugam^{1*}, “Poly(1,6-heptadiyne)/ABS Functionalized Microfibers for Hydrophobic Applications.” *Journal of Polymer Research* 2019, 27(1), 14. (DOI: [10.1007/S10965-019-1981-4](https://doi.org/10.1007/S10965-019-1981-4)) (Impact Factor: 3.097) (Citation = 17) (ISSN: No.: 1572-8935) [2019]
8. RaviPrakash Magisetty¹, **Pawan Kumar**³, Prakash M Gore¹, Mutyalanaidu Gan ivada³, Anuj Shukla², Balasubramanian Kandasubramanian^{1*}, Raja Shunmugam^{3*}, “**Electronic Properties of Poly(1,6-heptadiynes) Electrospun Fibrous Non-woven Mat.**” *Materials Chemistry and Physics* 2019, 223, 343-352. (Impact Factor: 4.094) (DOI: [10.1016/J.MATCHEMPHYS.2018.11.020](https://doi.org/10.1016/J.MATCHEMPHYS.2018.11.020)) (Citation = 32) (ISSN: No.: 0254-0584) [2019]

7. **Pawan Kumar**, Mutyala Naidu Ganivada, Diptendu Patra, Pintu Kanjilal, Manikandan Mohanan, Jayasri Das Sarma[#] and Raja Shunmugam*, “Polymer-Based Vehicles by Cyclopolymerization for the Delivery of Nonfluorescent Drugs.” *ACS Omega* 2018, 3 (12), 17555-17561. (DOI: [10.1021/ACSOMEGA.8B02437](https://doi.org/10.1021/ACSOMEGA.8B02437)) (Impact Factor: 3.512) (Citation = 1) (ISSN: No.: 2470-1343) [2018]
6. RaviPrakash Magisetty¹, **Pawan Kumar**³, Viresh Kumar¹, Anuj Shukla², Balasubramanian Kandasubramanian^{1*}, Raja Shunmugam^{3*}, “NiFe₂O₄ / poly(1,6-heptadiyne) Nanocomposite Energy Storage Device for Electrical and Electronic Applications.” *ACS Omega* 2018, 3(11), 15256-15266. (DOI: [10.1021/ACSOMEGA.8B02306](https://doi.org/10.1021/ACSOMEGA.8B02306)) (Impact Factor: 3.512) (Citation = 25) (ISSN: No.: 2470-1343) [2018]
5. Mutyala Naidu Ganivada, **Pawan Kumar**, Ajin Babu, Jayasri Das Sarma[#], Raja Shunmugam*, “Engineering New Class of Multi-arm Homopolymer for Stimuli Responsive Drug Delivery.” *ACS Biomaterials Science & Engineering* 2017, 3 (6), 903–908. (DOI: [10.1021/ACSBIOMATERIALS.7B00100](https://doi.org/10.1021/ACSBIOMATERIALS.7B00100)) (Impact Factor: 4.749) (Citation = 15) (ISSN: No.: 2373-9878) [2017]
4. Mutyala Naidu Ganivada, Vijayakameswararao N., **Pawan Kumar**, Sourav Bhattacharya, Raja Shunmugam*, “Efficient Approach to Produce Multi-functional Copolymers for Effective DNA Binding.” *Polymer for Advanced Technology* 2017, 28, 271-280. (DOI: [10.1002/PAT.3884](https://doi.org/10.1002/PAT.3884)) (Impact Factor: 3.665) (Citation = 4) (ISSN: No.: 1042-7147) [2017]
3. Mutyala Naidu Ganivada, **Pawan Kumar**, Pintu Kanjilal, Himadri Dinda, Jayasri Das Sarma[#], Raja Shunmugam*, “Polycarbonate Based Biodegradable Copolymers for Stimuli Responsive Targeted Drug Delivery.” *Polymer Chemistry* 2016, 7, 4237-4245. (DOI: [10.1039/C6PY00615A](https://doi.org/10.1039/C6PY00615A)) (Impact Factor: 5.582) (Citation = 41) (ISSN: No.: 1759-9962) [2016]
2. Mutyala Naidu Ganivada, **Pawan Kumar**, Raja Shunmugam*, “Unique Polymeric Gel by Thiol-Alkyne Click Chemistry.” *RSC Advances* 2015, 5, 50001-50004. (DOI: [10.1039/C5RA06339F](https://doi.org/10.1039/C5RA06339F)) (Impact Factor: 3.361) (Citation = 23) (ISSN: No.: 2046-2069) [2015]
1. Mutyala Naidu Ganivada, Vijayakameswararao N., Himadri Dinda, **Pawan Kumar**, Jayasri Das Sarma[#], Raja Shunmugam*, “Biodegradable Magnetic Nanocarrier for Stimuli Responsive Drug Release.” *Macromolecules* 2014, 47(8), 2703-2711. (DOI: [10.1021/MA500384M](https://doi.org/10.1021/MA500384M)) (Impact Factor: 5.985) (Citation = 45) (ISSN: No.: 0024-9297) [2014]

ΣIF: 72.895 Citations: 220 h-index: 8 i-index: 7

Manuscript Revision / Submitted/Preparation

1. Diptendu Patra, Saurav Kumar, **Pawan Kumar**, Ipsita Chakraborty, Rangeet Bhattacharya[#] and Raja Shunmugam*, “Fe(III) Coordinated Sequential Receptor-Mitochondria Dual Targeting T1 Weighted MRI Competent Theranostic Polymer for Effective and Precise Chemotherapy.” [Revision]

2. Tapendu Samanta, Narayan Das, Diptendu Patra, **Pawan Kumar** and Raja Shunmugam, A bromophenol derivative for rapid detection of $\text{Hg}^{2+}/\text{CH}_3\text{Hg}^+$ in both environmental and biological samples through the activation of the ESIPT process. [Submitted]
 3. Rajan Kumar, **Pawan Kumar**, Swati Panigrahi, Narayanan Lakshminarasimhan and Raja Shunmugam, "Unique Approach for Engineering Mesoporous Triazole Derived Hybrid Polyurethane showing Efficient Water Remediation. [Submitted]
 4. **Kumar, P.**; Patra, D. and Shunmugam, R. Efficient Non-fluorescent Anti-tumor Chlorambucil Delivery System using Cyclopolymerization.
 5. **Kumar, P.**; Patra, D. and Shunmugam, R. Engineered 1,6-Heptadiynes Based Cyclopolymer System for Combinational Therapy.
 6. **Kumar, P.**; Patra, D.; Samanta, T.; Shunmugam, R. Cyclopolymerization Based Drug Delivery and Real-time Tracking of Biodistribution of Coumarin Modified Chlorambucil.
 7. **Kumar, P.**; Patra, D.; Biswas, S. and Shunmugam, R. 1,6-Heptadiynes Based Cyclopolymer for Mitochondria Targeting and Real-time Tracking of Chlorambucil for Cancer Therapy.
 8. **Kumar, P.**; Sundaria, N.; Ganivada, M. N.; Nair, A. and Shunmugam, R. Norbornene Copolymer Based Efficient Antibacterial Activity using Phosphate and Cationic Charge.
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Reviewer

- Reviewed manuscript for the following Journals
 - [Polymer for Advanced Technology – Wiley](#)
 - [Gels - MDPI](#)
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Patent

- As Sensor and trapper; Sanjib Pariyal, Rajan Kumar, Tapendu Samanta, **Pawan Kumar**, Raja Shunmugam, TEMP/E-1/46586/2018-KOL. [2019]
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Industrial Experience

[2015 - 2021]

- Working for ADO Additives Mfg. Pvt. Ltd. for [synthesis of polymer-based in-field arsenic removal system from water](#).
 - Working for ADO Additives Mfg. Pvt. Ltd. for [synthesis of polymer-based superplasticizers which will be used as admixture in cement](#).
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Awards and Fellowships

1. Received "**Best Performing Student of the Year**" award by Department of Chemical Sciences in "DCS Department Day" on 08 March 2019. [Mar 2019]
 2. My team received "**3rd position in Swachhta Summer Internship 2018**" organized by Government of India. [2018]
 3. Received **DST-INSPIRE** fellowship to pursue PhD in India. [Aug 2015 - Feb 2021]
 4. Received **DST-INSPIRE** scholarship during Integrated BS-MS courses. [Aug 2009 - May 2014]
 5. Ranked in extended merit list of candidates in the **Joint Entrance Exam (JEE)** conducted jointly by IITs. [2009]
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Teaching Experience

1. Teaching Assistant for the course CH1102 “**Chemistry Lab 1**” experimental lab of Integrated BS-MS course. [Autumn 2019-20]
 2. Teaching Assistant for the course CH2203 “**Synthesis and Characterization Laboratory**” experimental lab of Integrated BS-MS course. [Spring 2018-19]
 3. Teaching Assistant for the course CH1102 “**Chemistry Lab 1**” experimental lab of Integrated BS-MS course. [Autumn 2018-19]
 4. Teaching Assistant for the course CH1102 “**Chemistry Lab 1**” experimental lab of Integrated BS-MS course. [Autumn 2017-18]
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Technical Skills

Synthesis: Accomplished in Organic Synthesis (polymers and small-molecules). Controlled Cyclopolymerizations, Ring Opening Metathesis Polymerizations (ROMP), Ring Opening Polymeization (ROP), Click Chemistry, Polymer modifications, Inert Atmosphere Schlenk Techniques and Synthesis of polymeric gel materials using chemical cross linkers.

Purification: Recrystallization, Distillation, Column Chromatography, Dialysis

Cellular Study: Cell viability, Cell internalization, Crystal Violet (with cancer cell lines like MCF 7 and HeLa and normal cell line HEK 293).

Instrumentation Skills: Bruker 500 MHz NMR, Jeol 400 MHz NMR, Gel Permeation Chromatography (GPC), Advanced Polymer Chromatography (APC), Rheometer, Fourier Transform Infrared Spectroscopy (FT-IR), Attenuated Total Reflectance (ATR), Dynamic Light Scattering (DLS), Thermogravimetric Analysis (TGA), Differential Scanning Calorimetry (DSC), UV Spectrophotometry, Fluorometry, Lyophilizer.

Symposium and Conferences

1. Attended the “Symposium on Polymer Sciences”, “**SPS 2019**” organized by Department of Chemical Sciences, IISER Kolkata. [Jul 2019]
2. Attended the “National Chemistry Scholar’s Colloquium”, “**NCSC 2019**” organized by Department of Chemical Sciences, IISER Kolkata research scholars. [Mar 2019]
3. Presented poster in the conference “National Conference on Organic Molecules as Synthons & Reagents for Innovation”, “**OMSRI 2019**” titled “Polymer-Based Vehicles by Cyclopolymerization for the Delivery of Nonfluorescent Drugs.” [Feb 2019]
4. Presented poster in the conference “International Conference on Polymer Science and Technology”, “**MACRO 2018**” titled “Colored Polymeric Nanocarrier for the Efficient Delivery of Colorless Drugs for Cancer Therapy.” [Dec 2018]
5. Attended the symposium “Supramolecular Chemistry in Biology and Functional Materials”, “**SCBFM 2018**”. [Mar 2018]
6. Presented poster in the workshop “**Indo-Russia workshop**” titled “Polycarbonate and Polylactide Based Biodegradable Nanocarrier for Targeted Drug Delivery.” [Oct 2017]
7. Attended the conference “Asian Meeting on Metal Oxide Assemblies”, “**AMMOA 2017**”. [May 2017]
8. Attended the conference “Smart Materials: Methods and Applications”, “**SMMA 2017**”. [Apr 2017]
9. Presented poster in international conference “**RAFMN 2017**”, Recent Advancement in Functional Materials and Nanotechnology” titled “Polycarbonate Based Biodegradable Polymers for Stimuli Responsive Targeted Drug Delivery.” [Feb 2017]
10. Presented poster in international conference “**MACRO 2017**”, Advances in Polymer Sciences and New Generation Technology” titled “Polycarbonate Based Biodegradable Polymers for Stimuli Responsive Targeted Drug Delivery.” [Jan 2017]

11. Attended “**One Day Discussion** Meeting on Supramolecular and Polymer Assembly” on 5th January 2017 at Indian Institute for the Cultivation of Science. [Jan 2017]
 12. Presented poster in international conference “**MACRO 2015**”, “International Symposium on Polymer Science and Technology” titled “Unique Dual Responsive Gels by Thiol-Alkyne Click Chemistry.” [Jan 2015]
 13. Presented poster at “**RTRSC-2014**”, national conference and expo on “Recent Trends in Polymer & Rubber Science & Technology, titled “Synthesis and Characterization of Doxorubicin Grafted Lactone Copolymer as a Magnetic Nanocarrier for Biological Application.” [Feb 2014]
 14. Presented poster of my work at “**RAPT-2014**”, international conference and expo on “Recent Advances in Polymer & Rubber Science & Technology, titled “Synthesis and Characterization of Doxorubicin Grafted Lactone Copolymer as a Magnetic Nanocarrier for Biological Application.” [Jan 2014]
 15. Presented poster at the conference of “3rd Federation of Asian Polymer Sciences (**FAPS**) Polymer Congress and **MACRO 2013**” titled “Caprolactone based Magnetic Copolymers for Biological Applications.” [May 2013]
 16. Presented poster at the conference of “**PolyTech-2012**”, “International Conference on Advances in Polymeric Materials & Nanotechnology” titled “Site Specific Norbornene Based Prodrugs for Cancer Therapy.” [Dec 2012]
 17. Attended the conference of “**PRC 2012**”, “Polymer & Rubber Technology for 21st Century: A Kaleidoscopic View of Research & Industrial Progress.” [Oct 2012]
 18. Attended the Tenth Symposium of CRSI Kolkata Chapter on “**Current Trends in Chemistry.**” [Aug 2012]
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Co-curriculum Activities

1. Served as volunteer in “**VIJYOSHI 2019** – National Science Camp jointly organized by KVPY, INSPIRE and DST-India. [Dec 2019]
 2. Served as volunteer in “**VIJYOSHI 2017** – National Science Camp jointly organized by KVPY, INSPIRE and DST-India. [Dec 2017]
 3. Served as volunteer in conference “**Asia Meeting on Metal Oxide Assemblies 2017** (AMMOA 2017).” [May 2017]
 4. Served as volunteer in conference “**Smart Materials: Methods and Applications** (SMMA 2017)”. [Apr 2017]
 5. Served as volunteer in conference “**Chemistry Interfacing with Biology and Physics** (CIBP 2017).” [Jan 2017]
 6. Served as volunteer in “Vigyan Jyoti Shivir” **VIJYOSHI 2016** – National Science Camp jointly organized by KVPY, INSPIRE and DST-India. [Dec 2016]
 7. Presented an exhibition on behalf of Department of Chemical Sciences, IISER Kolkata in **18th National Exhibition** on the theme of “**Science to the nation for progress of India**” for the motivation of school children towards science and research. [Sep 2014]
 8. Served the post of **Treasure of Athletics Club** in IISER Kolkata for consecutive two academic sessions 2011-12 and 2012-13. [Jan 2011 - Dec 2013]
 9. Participated in many essays writing and dance competitions during secondary school.
 10. In 7th standard my story got published in English newspaper (Hindustan Times in HT Teens section).
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References

- [Prof. Raja Shunmugam](#), PhD
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