Naganatha G. Patil
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Professional Summary:

- Expert in interdisciplinary chemistry with over seven years of post-Ph.D. experience in designing and synthesizing functional monomers, polymers, and dendrimers.
- Proven track record of collaborative research resulting in more than fifteen major publications and patents.
- Skilled in leading technology transfer initiatives for industrial-scale synthesis. Passionate about developing new materials for sustainable applications.

Professional and Educational history:

Research Scientist (R3) King Abdullah University of Science and Technology, KSA	**2022-Present**
Postdoctoral fellow: with Prof. Yves Gnanou King Abdullah University of Science and Technology, KSA	**2017-2022**
Postdoctoral fellow: with Prof. Il Kim Pusan National University, South Korea	**3/2017-11/2017**
Ph.D. in Chemical Sciences: with Dr. Ashootosh V. Ambade Academy of Scientific and Innovative Research (AcSIR), CSIR-National Chemical Laboratory, India	**2011-2017**
Quality Control Officer Cipla Pharmaceuticals Ltd., India	**2008-2009**
Master of Science in Organic Chemistry Shivaji University, India	**2006-2008**
Bachelor of Science in Chemistry Sangameshwar college, Shivaji university, India	**2003-2006**

Research Experience:

Research Scientist at King Abdullah University of Science and Technology, KSA
11/2022-Present

- Developed industrially feasible approaches for synthesizing low molar mass polycarbonates and polyether polyols.
- Pioneered a novel process for preparing polyols with a high content of primary hydroxyl functionality, suitable for polyurethane industries.
- Demonstrated scale-up synthesis of polyols and transformation of secondary hydroxyl groups to primary on a kilo scale.
- Developed environment-degradable copolymers of o-Phthalaldehyde with cyclic monomers.

Postdoctoral fellow at King Abdullah University of Science and Technology, KSA
11/2017-11/2022

- Designed and developed new strategies for the ring-opening copolymerization of epoxides with aldehydes for environment-degradable polymeric materials
- Developed metal-free strategies for CO_2 utilization to obtain aliphatic polycarbonate diols using pressure reactors. Demonstrated this process of making polycarbonate diols to industry on a kilo scale using high-pressure reactors.
- Produced 10 kg polyether and polycarbonate polyols using high-pressure reactors with industrial collaboration.
- Developed a recycling process for catalyst and initiator cations from CO_2-based polycarbonates.
- Utilized a combination of polymerization techniques to improve polymer properties and prepared mechanically distinct block copolymers.

Postdoctoral fellow, Pusan National University, South Korea

3/2017-11/2017

- Synthesized multi-stimuli responsive multifunctional dendrimers as a drug delivery material using multistep reactions.
- mentored masters and graduate students by closely collaborating with their projects.

Ph.D. in Chemical sciences/Polymer chemistry from Academy of Scientific and Innovative Research (AcSIR), CSIR-National Chemical Laboratory, India

1/2011-2/2017

- Obtained a Government of India-sponsored UGC-NET fellowship for doctoral studies
- Synthesized new monomers, initiators, and dendrimers by multistep organic reactions, stimuli-responsive dendritic block copolymers, homopolymers, and block copolymers, using schlenk line technique
- Learned polymerization techniques, Ring-opening polymerization (ROP), Atom Transfer Radical Polymerization (ATRP), Reversible Addition-fragmentation Chain Transfer Polymerization (RAFT), Anionic Polymerization, Condensation polymerization
- Prepared functional poly(lactide) and poly(caprolactone) and attached to dendrimers to obtain amphiphilic dendritic block copolymers. The samples were studied for solution self-assembly and temperature-responsive morphology change due to a change in the crystallinity of polyesters.
- Using Anionic polymerization technique prepared telechelic triblock copolymer poly(butadiene-*b*-isoprene-*b*-butadiene) P(BIB) for DRDO India.
- Prepared visible light responsive block copolymer for drug release application.
- Prepared fifth-generation G_5-PAMAM dendrimers, and telechelic polyesters as part of collaboration with other groups.
- Used various characterization techniques like NMR, IR, UV-Vis, XRD, MALDI-TOF, GC, GPC, DSC, TGA, DLS, SEM, TEM

Quality Control Officer, Cipla Pharmaceuticals Ltd., India

2008-2009

- Conducted stability studies of liquid drug samples to determine shelf life.

Publications and Patents:

1. **Patil, Naganath**; Feng, Xiaoshuang; Gnanou, Yves; Efficient process to make polyols with primary hydroxyl functionality Enhancing Polyurethane Foam Reactivity and Recycling. *Manuscript under preparation*.

2. **Patil, Naganath**; Feng, Xiaoshuang; Gnanou, Yves; Low Molar Mass Polycarbonate Diols From Degradation of Terpolymers Obtained by Epoxide/o-Phthalaldehyde/CO2 Copolymerization. *Journal of CO2 Utilization*. **2024** 83, 102795.

3. Feng, Xiaoshuang; **Patil, Naganath**; Jia, Mingchen; Gnanou, Yves; "Quantitative Ethylene Oxide Capping of Secondary Hydroxyl-Terminated Polyols Using Tosyl Isocyanate." Patent application submitted. Application Number: United States 63/524,997

4. **Naganath Patil**, Yves Gnanou, and Xiaoshuang Feng; "Anionic Copolymerization of *o*-Phthalaldehyde with Epoxides: Facile Access to Degradable Polyacetals and Their Copolymers under Ambient Conditions", *Macromolecules*. **2022** 55, 7817-7826.

5. **Naganath Patil**, Yves Gnanou, and Xiaoshuang Feng; "Orthogonally Grown Polycarbonate and Polyvinyl Block Copolymers from Mechanically Distinct (Co)Polymerizations", *Polym. Chem.* **2022**, 13, 2988-2998.

6. Feng, Xiaoshuang; **Patil, Naganath**; Boopathi, Senthil; Gnanou, Yves; Hadjichristidis, Nikos; "Polycarbonate polyols, systems for the synthesis of polycarbonate polyols and recovering initiators and/or activators for use or re-use in the synthesis of polycarbonate polyol", *US Patent App.* 17/413,030 (**2022**)

7. Feng, Xiaoshuang; **Patil, Naganath**; Lucini,Caroline; Gnanou, Yves; Hadjichristidis, Nikos; ''Supported onium salts as initiators for the synthesis of polycarbonates by copolymerization of CO2 with epoxides'', *US Patent App.* 17/051,292 (**2021**)

8. **Naganath Patil**, Senthil Bhoopathi, Vamshi Chidara, Nikos Hadjichristidis, Yves Gnanou, and Xiaoshuang Feng; "Recycling a Borate Complex for Synthesis of Polycarbonate Polyols: Towards an Environmentally Friendly and Cost-Effective Process" *ChemSusChem* **2020**, 13, 5080-5087.

9. **Naganath G. Patil**, Senthil K. Boopathi, Prakash Alagi, Nikos Hadjichristidis, Yves Gnanou, and Xiaoshuang Feng, "Carboxylate Salts as Ideal Initiators for the Metal-Free Copolymerization of CO_2 with Epoxides: Synthesis of Well-Defined Polycarbonates Diols and Polyols" *Macromolecules*, **2019**, *52*, 2431-2438.

10. **Naganath G. Patil**, Rimesh Augustine, Yu Zhang, Sung Chul Hong, and Il Kim, "Synthesis of Stimuli-Responsive Heterofunctional Dendrimer by Passerini Multicomponent Reaction" *ACS Omega*, **2019**, *4*, 6660-6668.

11. Bhawana Pandey, **Naganath G. Patil**, Govind S. Bhosle, Ashootosh V. Ambade, and Sayam Sen Gupta, "Amphiphilic Glycopolypeptide Star Copolymer-Based Cross-Linked Nanocarriers for Targeted and Dual-Stimuli-Responsive Drug Delivery" *Bioconjugate Chem.* **2019**, *30*, 633−646.

12. Manoj Kumar, **Naganath G. Patil**, Ashootosh V Ambade, and Guruswamy Kumaraswamy, "Large PAMAM dendron induces formation of unusual $P4_332$ mesophase in monoolein/water systems'' *Langmuir*, **2018**, *34*, 6827-6834

13. **Naganath G. Patil**, Nitin B. Basutkar and Ashootosh V. Ambade, "Copper and silver nanoparticles stabilized by bis-triazole-based dendritic amphiphile micelles for reduction of 4-nitrophenol'' *New J. Chem.,* **2017**, 41, 4546-4554.

14. Debasis Pati, Soumen Das, **Naganath G. Patil,** Nimisha Parekh, Dalaver H. Anjum, Vinita Dhaware, Ashootosh V. Ambade, and Sayam Sen Gupta, "Tunable nanocarrier morphologies from glycopolypeptide-based amphiphilic biocompatible star copolymers and their carbohydrate specific intracellular delivery" *Biomacromolecules*, **2016**, *77*, 466-475.

15. Ashootosh V. Ambade and **Naganath G. Patil**; "Synthesis of biocompatible two tailed dendritic copolymers." Indian Pat. Appl. (**2015**), IN 2013DE01872 A

16. **Naganath G. Patil**, Nitin B. Basutkar and Ashootosh V. Ambade, "Visible light-triggered disruption of micelles of an amphiphilic block copolymer with BODIPY at the junction'' *Chem. Commun*. **2015**, *51*, 17708-17711.

17. Manoj Kumar, **Naganath G. Patil**, Chandan Kumar Choudhury, Sudip Roy, Ashootosh V. Ambade and Guruswamy Kumaraswamy, "Compact polar moieties induce lipid-water systems to form discontinuous reverse micellar phase'' *Soft Matter*, **2015** , *11* , 5417-5424.

Conference Presentations:

1. Poster presentation at the 16th polymer pacific conference (PPC-16), Suntec city, Singapore. 2019
2. Poster presentation at FAPS-MACRO, International Conference on Polymers, Indian Institute of Science, Bangalore, India. 2013
3. Poster presentation at Indo-US bilateral conference, Thiruvananthapuram, India 2013.
4. Poster presentation at National Science Day, CSIR-NCL, Pune, India 2012 and 2015.

Honors and Awards

- NET-JRF and NET-SRF scholarship from the Government of India for doctoral studies.
- BK-21 a prestigious fellowship for Postdoctoral research, South Korea.

Personal Details

- Male, Born on 21st February 1986, Married.

Declaration: I hereby declare that the above-mentioned information is true to the best of my knowledge.

Naganatha G. Patil