

Mihir Patel

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EDUCATION

MASTER OF SCIENCE, Chemical Engineering Graduation: May 2025
Arizona State University, Tempe, Arizona GPA: 4.0
Coursework: Soft Matter Morphology, Polymer Principles and Processing, Chem. Reaction Engineering, Fuel Cells and Biofuel Cell, Fundamentals of Scaleup, Design of Engineering Experiment, Semiconductor Microfabrication, Thermodynamics of Chem. Systems.

BACHELOR OF TECHNOLOGY, Chemical Engineering Graduation: Apr. 2021
Dharmsinh Desai University, Nadiad, Gujarat GPA: 3.7
Coursework: Instrumentation Process Control, Chemical System Modeling, Process Equipment Design and Drawing (AutoCAD), Plant Design Economics, Fluid Flow Operations, Heat Transfer, Mass Transfer, Chemical Process Safety, Environmental Science.

SKILLS

Laboratory Techniques: Catalysis, Distillation, Polymerization, NMR Spectroscopy, SEC, DSC, DMA, TGA, TEM, SEM, UV-Vis
Professional - Technical: Process Design and Optimization, Panel Control, System Modeling, Fluid Mechanics, Separation Process, Environmental Impact Analysis, Sustainable Development Techniques, Chemical Waste Management, Process Safety Management
Engineering Software Tools: AutoCAD, CHEMCAD, Aspen Plus, HYSYS, MATLAB, COMSOL, VisiMix, JMP, MestReNova

EXPERIENCE

Graduate Research Assistant, Sustainable Macromolecular Materials Manufacturing, Arizona State University Jan 2024 – Present

- Conducted controlled studies to dissect the effects of enthalpic and entropic interactions on nanoparticle diffusion within Homopolymer and Copolymer matrices, employing advanced techniques such as PET-RAFT polymerization and SEC.
- Pioneered the synthesis of Homopolymers and Copolymers and Polymer nanocomposites with surface-functionalized nanoparticles (2-5 nm), achieving a 40% increase in self-healing efficiency compared to conventional nanocomposites.
- Utilized Transmission Electron Microscopy (TEM) and UV-vis spectroscopy to quantify a 30% reduction in nanoparticle aggregation during polymer processing, ensuring homogenous properties and improving mechanical strength of materials.
- Developed energy-efficient, autonomously self-healing nanocomposite systems extending life span of materials, aligning with circular economy principles to reduce environmental impact and plastic waste.
- Awarded the prestigious “MORE” Research Scholarship for exceptional research contributions; effectively presented findings at institutional seminars, fostering collaboration and knowledge sharing.

Chemical Process Engineer, [Onsite] Greenovat Organics Private Limited, Vadodara, Gujarat May 2021 – June 2023

- Analyzed, honed and streamlined a manual assembly line process, ultimately resulting in a remarkable 15% increase in overall operational efficiency.
- Spearheaded efforts to cut down process scrap and effluent from an underperforming ETP (Effluent Treatment Plant) under guidance of mentor in R&D division, enhancing sustainability and environmental compliance.
- Applied data-driven analysis and engineering expertise to identify and address inefficiencies, leading to enhanced productivity and over 10% residue reduction.
- Collaborated cross-functionally with 2 division heads to implement process improvements, demonstrating strong teamwork and communication skills.
- Identified best practices for 50 labor workers across entire production unit to maintain company's commitment to sustainability by executing measures aligned with environmental regulations.

PROJECTS

Copper Metal Extraction from Waste Effluent Process Design Aug. 2022 – Dec. 2022

- Identified process to retrieve Copper Metal from effluent Mother Liquor containing residual catalyst CuCl_2 to reduce wastage of expensive CuCl_2 solution during disposal of plant Wastewater at ETP.
- Designed a method with integration of other existing spent AlCl_3 recovery method at plant by using comparatively cheaper Iron-Gauge to extract Copper metal ultimately attaining 8% increment in plant economy.
- Optimized Energy Efficiency Framework to consume Plant's utilized hot steam to get desired temperature for required Unit Operations achieving 20% improvement in operational efficiency.

Spent AlCl_3 Utilization by means of PAC Production Method Development Sep. 2021 - July 2022

- Explored various utilization possibilities of spent AlCl_3 as a supplementary resource to manufacture either PAC or Aluminum Chloride Hexahydrate to reduce plant's 12% ETP Waste Management and Disposal cost.
- Developed and tested two methods to utilize spent AlCl_3 generating from two different plant processes to produce PAC while maintaining nearly 90% conversion as well as yield.
- Applied and verified several additional treatments on PAC to expand its usability in certain other chemical industrial sectors to further use it as a coagulant in the ETP or as a sizing material in the Paper and Pulp Industry.