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(Dimus Plus LLC)

List of Accomplishments 2022

1. Designed and developed commercial process for waste plastics conversion to diesel fuel (Dimus Plus LLC)
2. Designed commercial process for metals recovery from Lithium batteries waste (Dimus Plus LLC)
3. Designed and developed new process for manufacturing of battery grade Lithium Fluoride from technical grade Lithium Carbonate. (Dimus Plus LLC)
4. Designed commercial plant for acrylic acid manufacturing (240 KTA) via beta-propiolactone route (Novomer).
5. Designed pilot plant for Polypropiolactone production including control strategies developing for major process steps (Novomer, Rochester, NY)
6. Invented safe method for Ethylene Oxide separation from Acetaldehyde (Novomer)
7. Invented efficient method of dewatering of Tetrahydrofuran solvent via extractive distillation (Novomer)
8. Developed batch plant process model for manufacturing of Cobalt-based carbonylation catalyst (Novomer)
9. Solved polymerization initiator dosage problem by encapsulation of initiator into the target polymer (Novomer)
10. Developed new method of Sodium acrylate manufacturing in propanol (Novomer)
11. Proposed substantial improvements in bioethanol recovery: developed special tools for optimal design of recovery plant with high turndown ratio (Joule Unlimited).
12. Invented multipurpose mobile ethanol stripper for bioethanol plants (Joule Unlimited)
13. Proposed new design for solar coil-shaped tubular bioreactors following sun daily movements (Joule Unlimited)
14. Optimized CO₂ fluegas purification process for solar bioethanol production (Joule Unlimited)
15. Designed and built pilot plant for continuous ethanol recovery from solar bioreactor (Joule Unlimited, Hobbs, NM)
16. Designed downstream processes for recovery of Zeaxanthin in a highly pure crystalline form from fermented media. Batch+ simulation and retrofitting the whole plant (DSM, Germany)
17. Led commercialization projects for manufacturing carotenoids from genetically modified yeast cultures: downstream process design and technology transfer to tolling facilities (DSM Nutritional Products, Fermic S.A.-Mexico). Products include: beta-Carotene as vitamin A precursor, Astaxantine as fish colorant, Lutein as poultry food additive, Lycopene as food colorant.
18. Proposed new theory of carbon black formation from fullerenes and suggested seeding carbon black furnace reactor with fullerene particles to obtain products with predesigned particle size distributions (Cabot, Pampa, TX)
19. Optimized ultrafiltration process of purification carbon black nanoparticles reducing spray drying volume and manufacturing costs 2.5x (Cabot)

20. Commercialized manufacturing of chemically modified carbon blacks for electronics industry (Cabot and toller facilities)
21. Performed process scale-up from laboratory to pilot for the synthesis of Silver nanoparticles (Cabot).
22. Performed troubleshooting analysis of Waste water Biotreatment plant (latex wastes) and proposed new water purification process including filtration and adsorption (Cabot)
23. Proposed replacement of existing plate-and-frame filters to Membrane-type filter presses resulting in 40% major product capacity increase and 8x VOC solvents emission reduction. Proved new technology efficiency in a series of pilot trials (Waters)
24. Analyzed and optimized batch manufacturing schedule of multiproduct (>700 batches/year) chemical plant (Waters)
25. Solved polymer undesired viscosity growth problem (Akzo Nobel)
26. Optimized Chloro-Bromo-Methanes manufacturing process for variable market demand. Build kinetic models for liquid and gas-phase hydrobromination reactions (Dead Sea Bromine Group, Israel)
27. Redesigned n-Propanol solvent recovery plant resulting in 3x capacity increase, 10x wastes reduction and savings over \$1.2MM (Broomchemie, Netherlands)
28. Redesigned Brominated Wastes Treatment Plant (mineral acids, salts and organic solvents recovery, incineration) giving 2x plant capacity increase (DSBG)
29. Proposed new method for Chlorine gas purification from Bromine via salt chemosorption (Dead Sea Works).
30. Developed reliable Aspen+ models for all stages of Bromine production process from Dead Sea brines (DSBG).
31. Developed kinetic model on Methanol hydrobromination and proved that reaction takes place not in liquid but in vapor phase (DSBG)
32. Designed a process for production of highly pure gaseous HBr under elevated pressure. Scaled-up from Pilot Unit to manufacturing plant. (DSBG)
33. Designed Superfine Bromine Purification column. Performed lab tests and process scale-up. Unit was erected and specified product quality (99.995%) was achieved. (DSBG)
34. Developed new (“Global”) approach to the synthesis of optimal distillation systems for multiple components (RU)
35. Modified Pinch-design method for the synthesis of optimal heat exchanger networks with multiple utilities available (RU)