

Sustainable Separation Processes: Creating a Roadmap to Accelerate Industrial Application of Less Energy-Intensive Alternative Separations (ALTSEP)

Goal: Creation of an innovation roadmap for advancing the rational design and predictable, widespread industrial application of less energy-intensive separation processes as alternatives to distillation. The collaboratively-developed roadmap will identify and prioritize research, development, and demonstration needs for technology initiatives with the potential to transform the competitiveness and sustainability of the U.S. chemical industry.

Lead: American Chemical Society
Green Chemistry Institute Industrial Roundtables
1155 16th Street, N.W.
Washington, DC 20036

Federal Funding: \$500,000

Project Duration: 24 months

The proposal for this NIST AMTech planning project was developed in response to the escalating energy costs for separation by distillation at the heart of virtually all chemical processes. Equipment costs for separations are estimated at 50 percent to 90 percent of the capital investment for large-scale chemical plants. The technology infrastructure changes needed to facilitate industrial availability of less energy-intensive alternative separation processes are so fundamental and significant that they are far beyond the resources of one or even a small group of chemical companies.

The ACS GCI is initiating a collaborative effort with leaders in the chemical and pharmaceutical sector, universities, and professional organizations such as the AIChE (including its Institute for Sustainability, Separations Division, and Computational Molecular Simulation & Engineering Forum) and the Industrial Fluid Properties Simulation Collective to define needs for research, development, and demonstration of technologies enabling industrial application of alternative separation processes.

The development of a molecular property-based system for the industrial selection, simulation, and design of separation processes stemming from the roadmap will enable implementation of cost-effective, energy-efficient chemical separations enhancing the U.S. chemical industry's role as a leader in the global market. This could lead to:

- A significant reduction of energy usage and greenhouse gas emissions compared to separations via distillation.
- The recovery of valuable components in waste streams, increasing the U.S. chemical industry's competitiveness and substantially improving its environmental performance.
- New technologies and engineering tools that generate high-technology jobs.

This project is building on work begun by the ACS CGI Chemical Manufacturers Roundtable in 2013. Participation throughout the chemical and petrochemical industry will include most of the major players in the industrial sector as well as universities and research institutions.

Getting Involved: Achieving the project goal project depends on the participation of chemical science and engineering innovators across the full range of the separation process value chain. Stay tuned to *The Nexus* for information on how to learn more through the project web site when it becomes operational. At this time, we especially need more input from chemical and pharmaceutical manufacturers on the types of separations (e.g., alkene-alkane) performed via distillation to assure that roadmapping is focused on industrially relevant separation needs. If you would like to provide such input, please contact us.

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