

Vision

To foster the development of new chemical processes intensified through fundamental process R&D

Objectives

- Transform separations and/or reactions applications into modular intensified chemical processes requiring less capital, operating costs and energy consumption for energy intensive processes
- Develop fundamental technologies and hierarchical multiscale, multifunctional materials to enable intensification and/or modularization of a separation, reaction or hybrid systems
- Create scale out technologies for use of alternative energy forms (microwaves, plasmas, electrocatalytic processes)
- Advance inherently low energy separation processes (e.g., adsorption/membranes) and energy efficient reaction platforms
- Develop fundamentals for multifunctional modules, including hybrid separation/reaction schemes that utilize adsorption and membrane processes, reactor/heat exchangers and mixers, and temporally coupled systems

Key Approaches

- Facilitate interactions between industrial, academic and government facilities to capitalize on resources from bench to pilot to full scale operations
- Develop and successfully integrate process intensification and modularization fundamentals into existing large scale chemical processes and emerging distributed and remote applications
- Utilize state-of-the-art experimental facilities and exceptional modeling proficiencies at all length scales to bolster process intensification fundamentals applied to reaction and separation

Expected Outcomes

- Multiscale modeling tools to design intensified reaction, adsorption, membrane and hybrid processes and associated materials
- Scale out methodologies for multifunctional process including use of alternative energy forms and design principles for multifunctional materials that enable modularization and process intensification
- Integration of intensified adsorption, membrane, reaction and/or hybrid processes in a modular fashion within the large scale chemical and petrochemical process industries
- Development of intensified adsorption, membrane, reaction and/or hybrid processes for distributed, modular applications

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RAPID's focal point for intensified process fundamentals efforts within all focus areas