Chemical Engineering

Fall 2022 Seminar Series

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Accelerating Scalable Decarbonization Efforts by Advancing Fundamental Insights into Fluid-Particle Interactions and Novel Carbon Transformations in Natural and Engineered Processes

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66-110
3:00-4:00pm
2:45pm Reception

Meeting our energy and resource needs while removing greenhouse gas emissions from our emissions, air and ocean is one of our grand societal challenges. Novel materials and processes are needed to capture, use, store, and remove greenhouse gases to foster a sustainable future. Towards this end, advancing the science of fluid-solid interactions in complex environments and harnessing this understanding to develop novel and scalable pathways to transform matter involving CO2 interactions is essential. In this context, we will discuss the role of emerging understanding of the organization and transport behavior of nanoconfined fluids as it relates to the capture, storage, and utilization of CO2 in natural and engineered environments. Novel multi-phase chemical pathways for producing hydrogen with inherent carbon removal and hybrid absorption-crystallization pathways in CO2 sourced hydrometallurgical pathways will be discussed in this context. The role of naturally occurring minerals, distributed biomass resources, and low value residues including alkaline residues in enabling our transition to a low carbon future are evaluated.