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Scalable Continuous Flow Hydrogenation Using Structured Catalyst Reactor

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In this talk we present a scalable solution for continuous heterogeneous catalysis, such as hydrogenation reactions. First, we discuss the Gore Structured Catalyst, a 3-dimensional PTFE mesh-based structure embedded with particles of supported catalyst. This 3-dimensional structure has tunable properties, such as porosity and catalyst loading, thus allowing for the construction of a structure with good catalyst mass loading at a low resistance to flow. We discuss then a new modular and scalable reactor design conceived to take full advantage of the Structured Catalyst substrates. We present design principles, scalability arguments, and experimental results with a model hydrogenation reaction. This case study highlights high catalyst utilization, tight temperature control, operation under high pressure, moderate pressure drop, quick scalability of the process, and no loss of catalyst material.

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