

Time Scale Analysis & Characteristic Times a Novel Approach in Assessing Design Performance of Microscale-Based Reactors and Operations;

A Case for Process Intensification & Modularization for Solid Catalyzed Chemical Reaction Processes in Microreactors.

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Time Scale Analysis & Characteristics Times is a novel and extremely useful tool in analyzing potential performance of microscale-based reactors and unit operations. Transport phenomena, reaction kinetics and phase contacting in microstructured architecture can be easily represented by **Characteristic Times** (CT), which embed themselves into a straightforward **Time Scale Analysis** (TSA) approach, used to assess preliminary designs of microreactors and unit operations quickly. The origin of **Characteristic Times** is in the detailed mathematical model of microscale-based reaction processes and operations.

In this presentation, we describe the geneses of the TSA, as developed in our research groups since 2005. We demonstrate the feasibility and usefulness of this novel tool in the field of chemical reaction engineering – exemplified by the use the use of TSA in the preliminary analysis of solid-catalyzed chemical reaction processes in microscale based structures.

The authors believe that this novel technical approach will take its place in the toolbox of practicing chemical reaction engineers in the future.

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Research Interest: Microscale-Based (bio)chemical reaction processes;

Mathematical modeling; Manufacturing of industrial scale processes;

Process Intensification & Modularization.

