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Micro Reactor Technology: Flow Chemistry Impact on Applied Catalysis

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Abstract

The micro reaction technology has emerged over the past two decades as one of the promising synthetic tools that can create new horizons in many industrial and catalysis applications. There are many crucial issues that could simply be solved by adopting the approach of micro reaction technology. Those issues are including harmful environmental impact which could be minimized through integrated separation techniques and reagent recycling used in micro reactors. There are also other issues including kinetic, thermodynamic, and process safety concerns. Moreover, chemical manufacturing has been enhanced through running reactions in continuous mode using flow chemistry. This lead to a great enhancement and improvement in solving many concerns related to particle size distribution, energy efficiency, surface to volume ratio, mass and heat transfer limitations, selectivity, high pressure, optimizing reaction conditions, scale-up issues, reproducibility, conversion, yield, process reliability, catalyst deactivation and recovery.

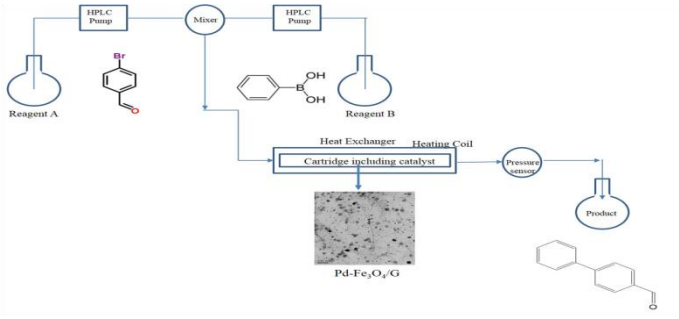
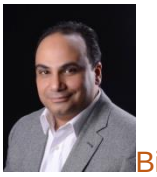


Figure 1 High-temperature/pressure capillary flow reactor.

Recent Publications

1. Hany A. Elazab, M. A. Sadek, and Tamer T. El-Idreesy (2018) Microwave-assisted synthesis of palladium nanoparticles supported on copper oxide, Adsorption Science and Technology, 36:1352-1365.
2. Hany A. Elazab, S. Moussa, Kendra Woodberry, B. Frank Gupton, and M. Samy El-Shall, (2017), Microwave-Assisted Synthesis of Pd/Fe_3O_4 Nanoparticles under flow reaction conditions, Journal of Green Processing and Synthesis (GREENPS), 6:413.
3. Hany A. Elazab, S. Moussa, Ali Siamaki, B. Frank Gupton, and M. Samy El-Shall, (2017), The Effect of Graphene on catalytic performance of Palladium Nanoparticles decorated with Fe_3O_4, Co_3O_4, and $Ni(OH)_2$, Catalysis Letters, 1510–1522.
4. Hany A. Elazab, Ali Siamaki, S. Moussa, B. Frank Gupton, M. S. El-Shall, (2015), Highly Efficient and Magnetically Recyclable Graphene-Supported Pd/Fe_3O_4 Nanoparticle Catalysts, Journal of Applied Catalysis A: General, 491:58-69.
5. Hany A. Elazab, S. Moussa, B. Frank Gupton, M. S. El-Shall, (2014) Microwave-assisted synthesis of Pd nanoparticles for CO oxidation, Journal of Nanoparticle Research, 16:2477



Biography

Dr. Hany Elazab is a senior Assistant Professor and Program Director of the chemical engineering department at British University in Egypt (BUE). He was awarded his Ph.D from (VCU) in USA. He participated in several research projects in Nanotechnology, Catalysis, and Micro Reactor Technology funded from (NSF) in USA. He also awarded Young Investigator Research Grant (YIRG) and High Impact Research Award from the British University in Egypt (BUE). He is teaching courses of engineering thermodynamics, catalysis, mass and energy balance, chemical engineering thermodynamics, and petrochemical production processes. He has published several research contributions to international journals, proceedings and international conferences. He is also participating as a reviewer and editorial board member in several international journals in catalysis, nanotechnology, chemical and environmental engineering.