Michael Soll et al., J Chromatogr Sep Tech 2016, 7:5(Suppl)
http://dx.doi.org/10.4172/2157-7064.C1.017

Introducing a versatile tandem µ-reactor-GC/MS system for rapid characterization of catalysts: Ethanol and citrus unshiu peel conversion

Michael Soll[1], Koichi Ito[1], Norio Teramae[1], Young-Min Kim[1,2], Chuichi Watanabe[1] and Young-Kwon Park[3]
[1]Frontier Laboratories, Japan
[2]Hallym University, South Korea
[3]University of Seoul, South Korea

Due to the increased demand for the renewable energy, many researchers are focusing on the thermal and catalytic conversion of biomass and bio-ethanol. Micro scale lab reactors are universally applied to the catalyst research as the first step for developing catalytic conversion process because the downscaling of reactor size offers many advantages such as cheaper equipment, less feeding material, screening capabilities, lower utility requirements and higher accuracy. Recently, a new tandem micro-reactor system, consisted with two independent micro reactors and directly interfaced with a conventional GC/MS system, was introduced for the fast and simple test of catalyst. The tandem micro reactor system consisted of two furnaces in series and is online coupled with a conventional GC/MS. Gas, liquid or solid samples can be introduced into a 1st furnace using a micro-syringe, micro feeder, or sample cup for gas preheating, liquid vaporization, or solid pyrolysis. The vapors from the 1st furnace meet the catalyst located in the catalytic bed of 2nd reactor and converted to other chemicals over a catalyst. The final products were moved to the GC via a deactivated metal needle, separated in the column and finally detected by MS. As first application conversion of ethanol to butadiene (→styrene butadiene rubber →tires) is shown. The efficiency and selectivity of the catalytic conversion of ethanol to butadiene affects the profitability and productivity of the entire process. The second application is considering inedible C. unshiu peel. A desirable treatment method is needed to use C. unshiu waste peel for producing value added fuel or chemical source from it. The tested applications for the catalytic conversion of ethanol and citrus unshiu peel well indicated the feasibility of tandem micro reactor-GC/MS system as a simple and fast screening tool for the catalytic reaction

Biography

Michael Soll has completed his PhD in Biology from RUB, Germany in 1993. He has been working in Business Development, Marketing and Sales of GC- and LC-MS based laboratory equipment since 20 years. In 2014, he became the Business Development Manager for the Frontier Laboratories Japan in Europe.

michael@frontier-lab.com

Notes: