

## [Rapid Online Fischer–Tropsch Reaction Monitoring using a Modified Frontier Tandem Micro-Reactor GC–MS System](#)

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### Abstract:

Conventional laboratory facilities used for Fischer–Tropsch (FT) catalyst evaluation usually consist of a reactor that is connected to an online gas chromatograph (GS). This arrangement is characterized by longer response times that make it difficult to acquire early reaction dynamics, which are crucial to the understanding of long-term catalyst performance. This article describes how the modification of a Frontier Single micro-Reactor, interfaced to a gas chromatograph–mass spectrometer (GC–MS) system, can facilitate rapid evaluation of catalysts for FT synthesis reaction. The study has been performed using an Ru/SBA-15 catalyst prepared by reduction of RuCl<sub>3</sub> using NaBH<sub>4</sub> and deposition on a synthesized mesoporous SBA-15 support and characterized using Brunauer–Emmett–Teller, scanning electron microscopy, transmission electron microscopy, thermogravimetric analysis, temperature programmed reduction, and X-ray diffraction techniques. The system was successfully modified to perform catalyst evaluation in batch and real-time modes. Unlike conventional FT setups, which require extended reaction times to generate the Anderson–Schulz–Flory plot and the chain growth probability ( $\alpha$ ), the modified system in this study allows the determination of product distribution and alpha value in less than 30 min from the start of the reaction.

\* Excerpted from online journal website (Click the title)

### Frontier Labs Products used:

Tandem micro-Reactor (RX-3050TR), UA<sup>+</sup>-1, UA-DTM-2.5N