

## Accepted Manuscript

### Fe-based Heterogeneous Catalysts for the Fischer-Tropsch Reaction: Sonochemical Synthesis and Bench-Scale Experimental Tests

Alberto Comazzi, Carlo Pirola, Mariangela Longhi, Claudia L. M. Bianchi, Kenneth S. Suslick

PII: S1350-4177(16)30253-X

DOI: <http://dx.doi.org/10.1016/j.ultsonch.2016.07.012>

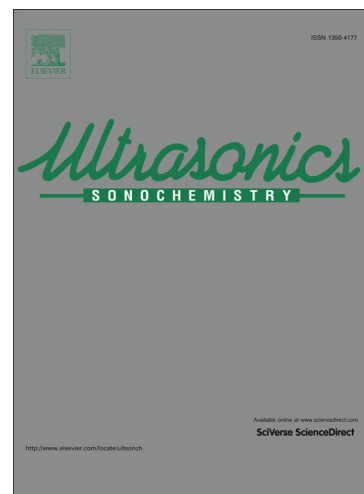
Reference: ULTSON 3310

To appear in: *Ultrasonics Sonochemistry*

Received Date: 3 May 2016

Revised Date: 12 July 2016

Accepted Date: 19 July 2016



Please cite this article as: A. Comazzi, C. Pirola, M. Longhi, C.L. M. Bianchi, K.S. Suslick, Fe-based Heterogeneous Catalysts for the Fischer-Tropsch Reaction: Sonochemical Synthesis and Bench-Scale Experimental Tests, *Ultrasonics Sonochemistry* (2016), doi: <http://dx.doi.org/10.1016/j.ultsonch.2016.07.012>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## Fe-based Heterogeneous Catalysts for the Fischer-Tropsch Reaction: Sonochemical Synthesis and Bench-Scale Experimental Tests

Alberto Comazzi<sup>1\*</sup>, Carlo Pirola<sup>1</sup>, Mariangela Longhi<sup>1</sup>, Claudia L. M. Bianchi<sup>1</sup>, Kenneth S. Suslick<sup>2</sup>

<sup>1</sup> Università degli Studi di Milano, Dipartimento di Chimica, via Golgi, 19 - 20133 Milano, Italy

<sup>2</sup> University of Illinois at Urbana-Champaign, School of Chemical Sciences, 505 S. Mathews Av., Urbana, IL 61801, USA

Corresponding author: Alberto Comazzi ([alberto.comazzi@unimi.it](mailto:alberto.comazzi@unimi.it))

### Abstract

The sonochemical synthesis of nanostructured materials owes its origins to the extreme conditions created during acoustic cavitation, *i.e.*, the formation of localized hot spots in the core of collapsing bubbles in a liquid irradiated with high intensity ultrasound (US). In particular, in the present work a sonochemical synthesis has been investigated for the production of three different iron-based samples supported on SiO<sub>2</sub> and loaded with different metals and promoters (10 %wt of Fe; 30 %wt of Fe; 30 %wt of Fe, 2 %wt of K and 3.75 %wt of Cu) active in the Fischer-Tropsch (FT) process. Sonochemically synthesized heterogeneous catalysts were characterized by BET, XRPD, TPR, ICP, CHN, TEM, SEM and then tested in a fixed bed FT-bench-scale rig fed with a mixture of H<sub>2</sub> and CO at a H<sub>2</sub>/CO molar ratio equal to 2, at activation temperatures of 350- 400 °C and reaction temperatures of 250- 260 °C. The experimental results showed that the ultrasonic samples are effective catalysts for the FT process. Notably, increasing the activation temperature increased CO conversion, while product selectivity did not diminish. All the sonochemically prepared samples presented in this work provided better catalytic results compared to the corresponding traditional FT impregnated catalysts.

Keywords: Fischer Tropsch, Iron based catalysts, Ultrasound, Syngas, Sonochemical synthesis.

Download English Version:

<https://daneshyari.com/en/article/7703728>

Download Persian Version:

<https://daneshyari.com/article/7703728>

[Daneshyari.com](https://daneshyari.com)