

Accepted Manuscript

Nanometer-Scaled Iridium Particles Gas-Phase-Loaded into the Pores of the Metal-Organic Framework MIL-101

Martin Friedrich, Mara Klarner, Justus Hermannsdörfer, Rhett Kempe

PII: S0277-5387(18)30552-7
DOI: <https://doi.org/10.1016/j.poly.2018.09.003>
Reference: POLY 13400

To appear in: *Polyhedron*

Received Date: 27 June 2018
Revised Date: 2 September 2018
Accepted Date: 3 September 2018

Please cite this article as: M. Friedrich, M. Klarner, J. Hermannsdörfer, R. Kempe, Nanometer-Scaled Iridium Particles Gas-Phase-Loaded into the Pores of the Metal-Organic Framework MIL-101, *Polyhedron* (2018), doi: <https://doi.org/10.1016/j.poly.2018.09.003>

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.



Nanometer-Scaled Iridium Particles Gas-Phase-Loaded into the Pores of the Metal-Organic Framework MIL-101

Martin Friedrich^{a,*}, Mara Klärner^a, Justus Hermannsdörfer^b, Rhett Kempe^{a,*}

^a Anorganische Chemie II, Universität Bayreuth, Universitätsstraße 40, 95447 Bayreuth, Germany

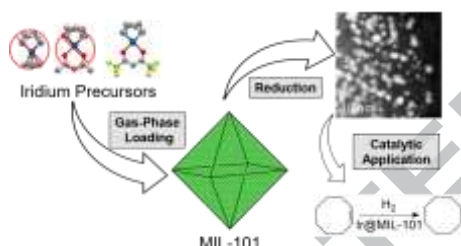
^b INM – Leibniz-Institut für Neue Materialien, Campus D2 2, 66123 Saarbrücken, Germany

* corresponding authors. E-mail addresses: martin.friedrich@uni-bayreuth.de (M.F.) & kempe@uni-bayreuth.de (R.K.)

Abstract

The controlled gas-phase loading of a metal-organic framework (MOF) to generate iridium nanoparticles is described. The key is the use of an Ir complex, which was small enough to fit through the pore apertures of the MOF, stable enough to be vaporized and labile enough to be reduced inside the pores of the MOF. Homogeneously distributed, nanometer-sized and highly crystalline iridium nanoparticles, located inside the pores of the still intact host matrix of MIL-101 (Cr) could be generated. The material was characterized using electron microscopy, X-ray diffraction, elemental analysis and nitrogen physisorption techniques. Initial catalytic tests showed a high activity in olefin hydrogenation.

Graphical Abstract & Synopsis



A suitable iridium complex or precursor for the gas phase loading of metal-organic frameworks has been identified. Loading and reduction/decomposition of the precursor could be carried out without destruction of the host matrix MIL-101(Cr). Nanosized, cavity-conform iridium nanoparticles located inside the pores were obtained, showing a high catalytic activity in olefin hydrogenation.

Keywords

Catalysis, gas phase loading, hydrogenation, iridium, metallic nanoparticle, metal-organic framework, MOCVD, MOF, precursor, reduction, stabilization

Download English Version:

<https://daneshyari.com/en/article/11006125>

Download Persian Version:

<https://daneshyari.com/article/11006125>

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