

Accepted Manuscript

Full Length Article

Surface-complexation synthesis of silica-supported high-loading well-dispersed reducible nano- Co_3O_4 catalysts using Co^{III} ammine hydroxo complexes

Weidong Zhang, Feng Pan, Jinjun Li, Zhen Wang, Wei Ding, Yi Qin, Feng Wu

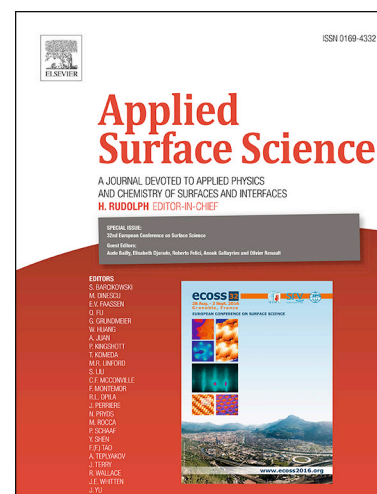
PII: S0169-4332(18)30437-9
DOI: <https://doi.org/10.1016/j.apsusc.2018.02.094>
Reference: APSUSC 38552

To appear in: *Applied Surface Science*

Received Date: 21 November 2017
Revised Date: 5 February 2018
Accepted Date: 9 February 2018

Please cite this article as: W. Zhang, F. Pan, J. Li, Z. Wang, W. Ding, Y. Qin, F. Wu, Surface-complexation synthesis of silica-supported high-loading well-dispersed reducible nano- Co_3O_4 catalysts using Co^{III} ammine hydroxo complexes, *Applied Surface Science* (2018), doi: <https://doi.org/10.1016/j.apsusc.2018.02.094>

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.



Surface-complexation synthesis of silica-supported high-loading well-dispersed reducible nano-Co₃O₄ catalysts using Co^{III} ammine hydroxo complexes

Weidong Zhang, Feng Pan, Jinjun Li*, Zhen Wang, Wei Ding, Yi Qin, Feng Wu*

School of Resources and Environmental Sciences, Hubei Key Laboratory of Biomass-Resources, Wuhan University,
Wuhan 430079, China

*Corresponding authors.

Email address: lijunjun@whu.edu.cn (J. Li), Fengwu@whu.edu.cn (F. Wu).

Abstract:

Silica-supported highly dispersed cobalt oxides prepared by adsorption are likely to be poorly reducible Co-phyllsilicates or CoO species. Here we report the synthesis of silica-supported monodispersed spinel nano-Co₃O₄ catalysts by inner-sphere complexation using Co^{III} ammine hydroxo complexes as precursors. The precursors were facilely prepared by stirring ammoniacal Co^{II} solutions exposed to air. The cobalt loadings (up to 188 mg/g) and particle sizes (3–10 nm) were tailored by successive complexation-calcination cycles. Such catalysts showed significantly superior reducibility and catalytic activity in complete propane oxidation in comparison to supported Co-phyllsilicates and CoO. A further development of this synthesis process may provide a variety of cobalt-based catalysts for important catalytic applications.

Keywords: Cobalt oxide; Silica; Nanoparticle; Cobalt ammine complex; Catalytic oxidation; Volatile organic compounds.

Download English Version:

<https://daneshyari.com/en/article/7834746>

Download Persian Version:

<https://daneshyari.com/article/7834746>

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