

Accepted Manuscript

Tungsten hexacarbonyl-induced growth of nickel nanorods and nanocubes

Lang Xiao, Ting Zhou, Yuanzhi Chen, Zhichao Wang, Hongfei Zheng, Wanjie Xu, Deqian Zeng, Dong-Liang Peng

PII: S0167-577X(18)31093-0
DOI: <https://doi.org/10.1016/j.matlet.2018.07.056>
Reference: MLBLUE 24622

To appear in: *Materials Letters*

Received Date: 2 April 2018
Revised Date: 11 July 2018
Accepted Date: 11 July 2018

Please cite this article as: L. Xiao, T. Zhou, Y. Chen, Z. Wang, H. Zheng, W. Xu, D. Zeng, D-L. Peng, Tungsten hexacarbonyl-induced growth of nickel nanorods and nanocubes, *Materials Letters* (2018), doi: <https://doi.org/10.1016/j.matlet.2018.07.056>

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.



Tungsten hexacarbonyl-induced growth of nickel nanorods and nanocubes

Lang Xiao, Ting Zhou, Yuanzhi Chen*, Zhichao Wang, Hongfei Zheng, Wanjie Xu, Deqian Zeng and Dong-Liang Peng

Department of Materials Science and Engineering, College of Materials, Xiamen University, Xiamen 361005, PR China

ABSTRACT

We report that the Ni nanocrystals with rod-like and cubic shapes can be prepared in organic solution with the aid of tungsten hexacarbonyl at a relatively low reaction temperature of 150 °C. The prepared Ni nanorods have a fivefold twinned structure with an average diameter of about 11 nm and length varying from several tens of nanometers to 150 nm whereas the obtained Ni nanocubes have an average size of about 19.2 nm. Magnetic measurements indicate that the as-prepared Ni crystals exhibit typical room-temperature ferromagnetic properties. The synthetic strategy revealed in this study provides useful guidelines for the preparation of non-spherical Ni nanocrystals.

Keywords: Nanoparticles; Magnetic materials; Crystal growth; Nanocrystals; Nanocubes

1. Introduction

Morphology and size control of metallic nanocrystals has always been an interesting research theme in nano science and technology for the pronounced shape and size effect of metallic nanocrystals on various applications such as catalysis [1] magnetism [2] optics [3] and biomedicine [4]. Ni is an important magnetic metal which has a special combination of magnetism, metallicity and high catalytic activity. Ni nanocrystals have attracted great research interest in recent years due to their wide applications in multiple fields such as catalysis, bioseparation, conductive materials and magnetic materials. Up to now, various synthetic strategies have been developed to prepare Ni nanocrystals with specific shape and size [5-17]. However, the prepared Ni nanocrystals in most cases usually have a

* Corresponding author. E-mail address: yuanzhi@xmu.edu.cn (Y. Chen)

Download English Version:

<https://daneshyari.com/en/article/8012542>

Download Persian Version:

<https://daneshyari.com/article/8012542>

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