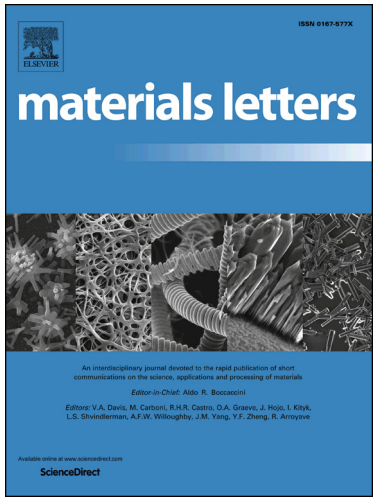
Accepted Manuscript



Supercritical CO_2-assisted Phase Transformation from Orthorhombic to Hexagonal MoO_3

Xuzhe Wang, Weili Cui, Meng Chen, Qun Xu

PII: S0167-577X(17)30663-8
DOI: http://dx.doi.org/10.1016/j.matlet.2017.04.110
Reference: MLBLUE 22531

To appear in: *Materials Letters*

Received Date: 22 January 2017
Revised Date: 22 April 2017
Accepted Date: 23 April 2017

Please cite this article as: X. Wang, W. Cui, M. Chen, Q. Xu, Supercritical CO_2-assisted Phase Transformation from Orthorhombic to Hexagonal MoO_3, *Materials Letters* (2017), doi: http://dx.doi.org/10.1016/j.matlet.2017.04.110

Supercritical CO_2-assisted Phase Transformation from Orthorhombic to Hexagonal MoO_3

Xuzhe Wang,[a] Weili Cui,[a] Meng Chen[a] Qun Xu *[a]

[a]College of Materials Science and Engineering, Zhengzhou University, Zhengzhou 450052, P. R. China;

Qun Xu, College of Materials Science and Engineering, Zhengzhou University, Zhengzhou 450052, P. R. China, Tel.: +86 371 67767827 Fax: +86 371 67767827 *E-mail: qunxu@zzu.edu.cn

Abstract

The metastable hexagonal phase of molybdenum oxide (h-MoO_3) have drawn much attention due to the novel one-dimensional tunnel structure and enhanced properties in physical, optical, chemical and electronic fields. Most of the researchers focused on the hydrothermal reaction to obtain h-MoO_3 using NH_4^+, Na^+ or K^+ ion as the structure-directing agents and stabilizer of the h-MoO_3, which will definitely hinder the further application of h-MoO_3. In this work, for the first time, we demonstrate a novel top-down method to obtain metastable h-MoO_3 via a topotactic phase transformation with the assistance of supercritical carbon dioxide (SC CO_2). Our study indicates that this successful phase transformation is due to distortion of MoO_6 octahedra units that might be induced by the surface tension change.

Key words: molybdenum oxide, supercritical CO_2, phase transformation, hexagonal phase, crystal structure