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Fourth Mexican Synchrotron Radiation Users Meeting 2014



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Fourth Mexican Synchrotron Radiation Users Meeting

Noviembre 27th-28th, 2014
UMAR, Huatulco, Oaxaca, Mexico

BOOK OF ABSTRACTS



www.unpa.edu.mx/mesyrum2014/

mesyrum2014@unpa.edu.mx

mesyrua@gmail.com

www.sciencechiapas.net/SRmexusers/index.html

Phone: 52(01)-287 87 59240 ext. 230





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Structural study of solid solutions $W_{1-x}Mo_xO_3 \cdot 0.33H_2O$ and $Bi_2W_{1-x}Mo_xO_6$

Arzola-Rubio A^a, Basurto-Cereceda S^a, Camarillo-Cisneros J^a, Fuentes-Cobas L^a, Ornelas C^a and Paraguay-Delgado F^a.

^a Física de Materiales, Centro de Investigación en Materiales Avanzados S C., Chihuahua, 31109, México.
Email: francisco.paraguay@cimav.edu.mx

Keywords: semiconductors, electron microscopy (STEM, TEM and SEM), crystallography.

Mo Solid solutions Tungstates are of great interest for solar harvesting. Thanks for their polymorphism, these materials show physical/chemical properties to be used in photocatalysis [1-3], hydrogen production [4-5] and charge batteries [6-8]. These oxides with two or three metals, such as binary tungsten-molybdenum oxides ($W_{1-x}Mo_xO_3$) or trimetallic with Bi ($Bi_2W_{1-x}Mo_xO_6$), show enhanced properties in comparison with unary Tungsten and Molybdenum oxides (WO_3 , MoO_3). The materials' band gap ($W_{1-x}Mo_xO_3$ and $Bi_2W_{1-x}Mo_xO_6$) tends to decrease by varying the percentage of Mo/W [9-10]. These values will allow us to take advantage of the visible solar radiation for different important purposes. These materials were synthesized by hydrothermal method from metallic salts with different Mo percentages ($x = 0.25, 0.50, 0.75$ and 1). The characterization by crystallographic methods shows a great problem to be indexed categorically, due to the interplanary proximity distances; that is why we use synchrotron generated radiation because of its great intensity and monochromaticity. In this present work we show studies of the characterization of these materials such as conventional XRD, SAED, Synchrotron radiation and Rietveld simulations. In Figure 1 we show the XRD patterns comparison of conventional XRD and synchrotron. In this graphic was compared $1/q$ vs. intensity using Fullprof software. We noticed a subtle difference, confirming the orthorhombic phase, without changes in the crystal lattice. In the synchrotron patterns, we can see the alumina sample holder peaks at $2\theta = 40$ and 50° . Figure 2a shows the compound $W_{0.25}Mo_{0.75}O_3$ where we can see the morphology of long crystals around 337 ± 223 nm and figure 2-b shows the SAED the monocrystallinity of the sample. We have fully characterized the whole samples having just pending a categorical detailed study of the solid solutions.

Acknowledgment: Thanks to the Electra Synchrotron at Trieste Italy for the XRD studies

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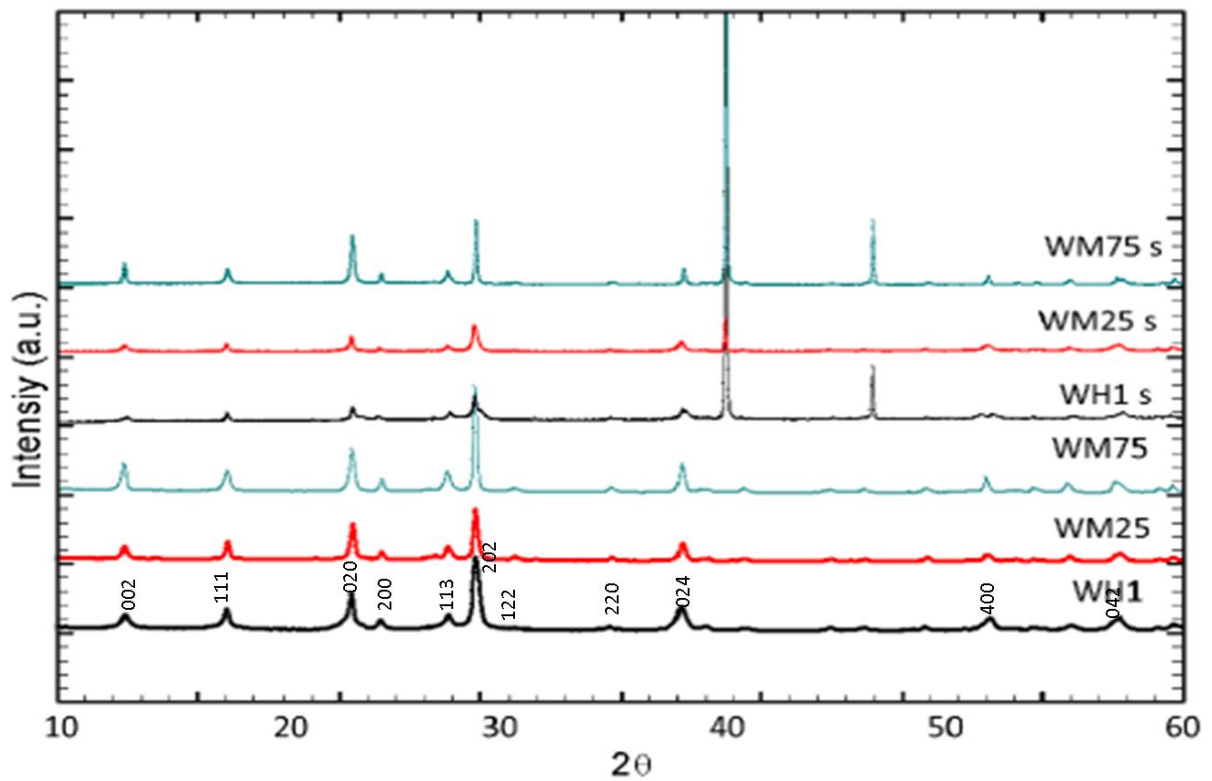


Figure 1. X-ray diffraction comparison by synchrotron and conventional for samples $\text{WO}_3 \cdot 0.33\text{H}_2\text{O}$, $\text{W}_{1-0.25}\text{Mo}_{0.25}\text{O}_3 \cdot 0.33\text{H}_2\text{O}$ and $\text{W}_{1-0.75}\text{Mo}_{0.75}\text{O}_3 \cdot 0.33\text{H}_2\text{O}$.

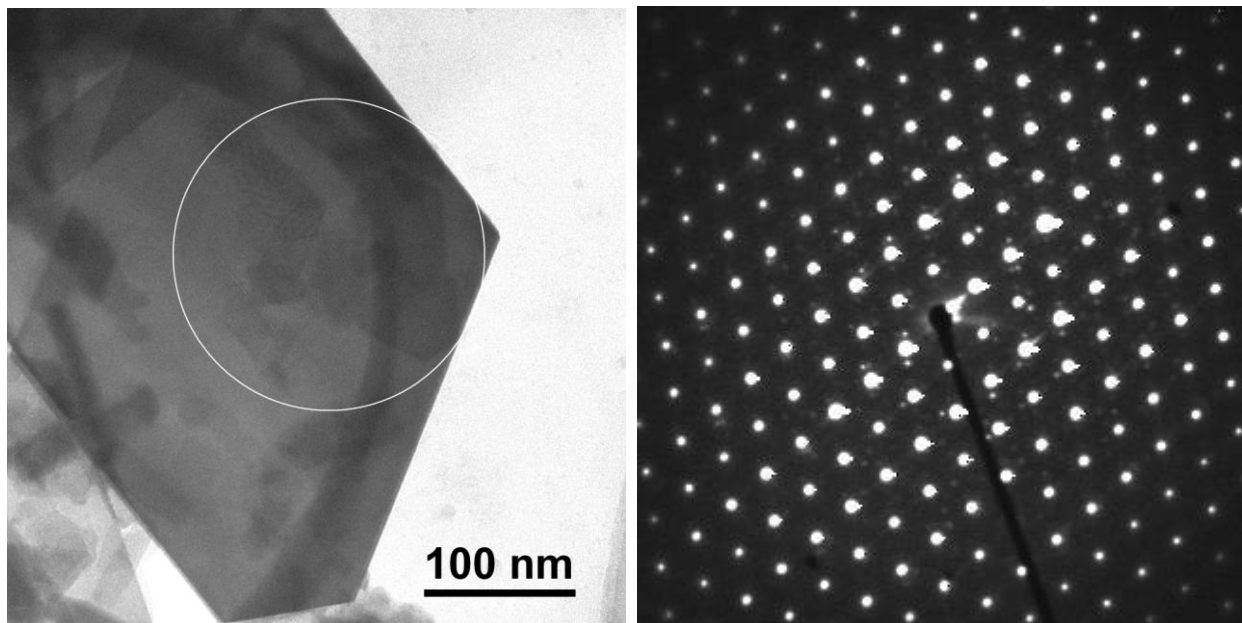


Figure 2a TEM bright field and Fig 2b SAED for the sample $\text{W}_{1-0.25}\text{Mo}_{0.25}\text{O}_3 \cdot 0.33\text{H}_2\text{O}$.

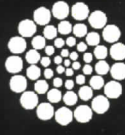
Huatulco 2014

MESYRUM

27-28 Noviembre



REUNIÓN DE USUARIOS MEXICANOS DE RADIACIÓN SINCROTRÓN



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FRANCISCO PARAGUAY DELGADO

POR LA PRESENTACIÓN DEL TRABAJO TITULADO

“STRUCTURAL STUDY OF SOLID SOLUTIONS W1-XMOXO3-0.33H2O AND B12W1-XMOXO6” DENTRO DE LA IV REUNIÓN DE USUARIOS MEXICANOS DE RADIACIÓN SINCROTRÓN (MESYRUM 2014).

27 Y 28 DE NOVIEMBRE 2014, UNIVERSIDAD DEL MAR, HUATULCO, OAXACA, MÉXICO.

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