Sociedade Brasileira de Química (SBQ)

Synthesis and characterization of γ -Ag_2WO_4 prepared by a facile precipitation method

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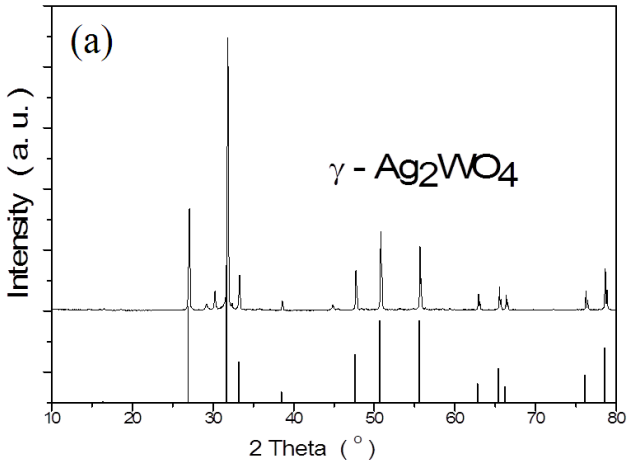
Introduction

The Silver Tungstate (Ag_2WO_4) is an important inorganic materials because of its vast applicability, such as: optical fibers, photoluminescent devices, batteries, lasers, humidity sensors, and other [1,2]. The Ag_2WO_4 has three different crystallographic forms: α-, β-, and γ-Ag_2WO_4. Of these, γ -Ag_2WO_4 is the most thermodynamically unstable phase, and few studies have been reported about the synthesis.

Results e Discussão

In this work, cubic γ -Ag_2WO_4 powders were synthesized by means of simples precipitation method, using $Na_2WO_4.H_2O$ and $AgNO_3$ solutions at room temperature in constant stirring for 20 min. The sample was characterized by means of XRD, Fig 1(a), to confirm the crystal structure (cubic structure with a space group Fd-3m - PDF N^o 33-1197-). Whereas, Raman spectra shows weak bands at 283, 768 and 851 cm^{-1} and a intense peak at 912 cm^{-1}. The morphology, shape and size, of synthesized particles was observed by the FEG-SEM micrograph. The optical properties like photoluminescence (PL) emission, Fig. 1(b), and UV spectrum were analyzed. The blue shift in PL intensity peak at 448 nm and the weak and broad green emission at ~ 580 nm were observed and the bandgap energy value was evaluated. The changes in crystal structure of the powders from 25 to 600 ^{o}C was studied using differential scanning calorimetry and a γ - α phase transformation at 183 ^{o}C was recorded.



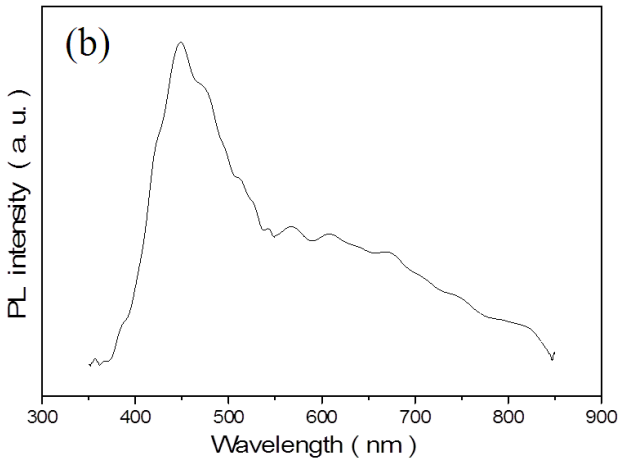


Figure 1. (a) XRD pattern and (b) Photoluminescence spectra of γ-Ag2WO4.

Conclusions

The γ-Ag_2WO_4 was synthesized by a facile solution approach and this could open opportunities for further investigating the applications of this metastable material.

Acknowledgments

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