Structure Properties of LiAl $(WO_4)_2$ Solid Solution

N. NAIMI*, B. REKIK, M. DERBAL

LASICOM Laboratory, Faculty of sciences, Saad Dahleb Blida1 University

*Corresponding author

Introduction

Tungstate crystals with the general formula AB $(WO_4)_2$, where A=Li is the alkaline element; the B=Al is trivalent element have attracted a great attention,for their great optical properties and high performance for many applications, such as optical fibers [1], scintillator materials [2],humidity sensors [3], catalysis [4], phosphor's and laser's light,[5]. For this study we analyzed by X-ray diffraction the crystalline structures of our compounds. The use of Xpert HighScore Plus identification. Due to the large difference in ionic radius between Li and Al, the formation of the LiAl $(WO_4)_2$ phase isincomplete, the goal of this work is to see what is thelimit of this phase to see the majority of the LiAl$(WO_4)_2$ phase, regarding temperature point of view, using the solid state reaction method.

Experimental

The synthesis of the compounds studied was carried out by solid-state reaction of Li2CO3, Al2O3 (Philips, 99.99%) WO3 (Philips, 99.97%). They were weighed in stoichiometric molar proportions. Single phases were obtained through the followingchemical reaction:

$$Li_2CO_3 + Al_2O_3 + 4WO_3 \rightarrow 2LiAl(WO_4)_2 + CO_2$$

In this work we have studied the structural propertie of LiAl(WO4)2, After the elaboration of powders ceramics,,the phases of the were identified by X-ray diffractionwhich they were obtained with a Bragg-Brentano Bruker D8 Advance diffractometer working with the Cu Ka radiation, thanks to a backward monochromator. The use of XPert Hight Score Plus identification software allowed us to find the most probable structure of the synthesized compound

Results and Discussion

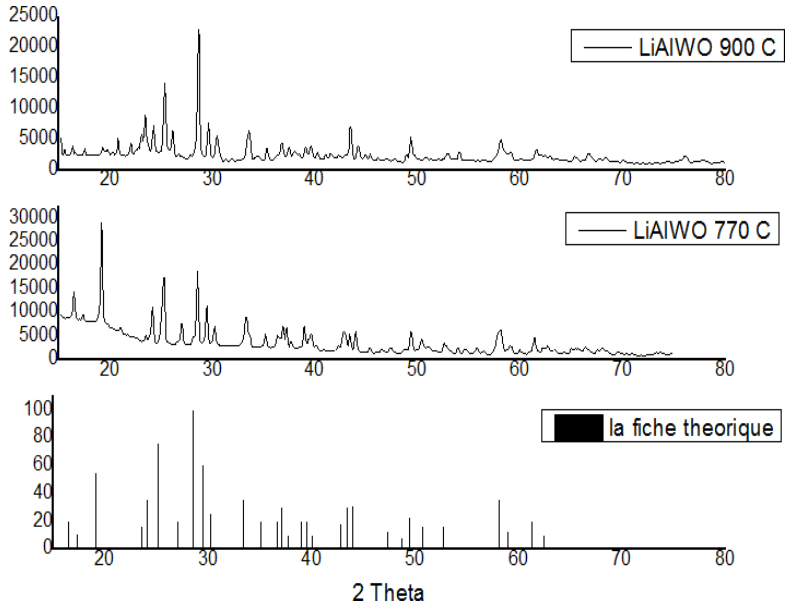

Fig.b: Powder LiAl (WO4)2 X Ray Diffraction at t= 770 . 900º C.

DOI: 10.21467/abstracts.122 ISBN: 978-81-954993-3-5

The phase identification by the High ScorPlus software makes it possible to the presence of the crystalline phase LiAl (WO4)2 as a function of heat treatment. fora thermal treatment of 770 ^{0}C on a 92% $LiAl(WO_4)_2$ and the rest Li_2WO_4.

Conclusion

materials of alkaline Li element and trivalent element Al have become compound actively studied for their remarkable optical properties.

References

[1] A.M. Kaczmarek, R. Van Deun, Chem. Soc. Rev. 42 (2013) 8835e8848.

[2] S. Dutta, S. Som, J. Priya, S. Sharma, Solid State Sci. 18 (2013) 114e122.

[3] L. You, Y. Cao, Y. Sun, P. Sun, T. Zhang, Y. Du, G. Lu, Sensor. Actuator. B Chem.161 (2012) 799e804

[4] B. Karami, S. Khodabakhshi, Z. Haghighijou, Chem. Pap. 66 (2012) 684e690.

[5] V. Petrov, M.C. Pujol, X. Mateos, O. Silvestre, S. Rivier, M. Aguil_o, R.M. Sol_e,J. Liu, U. Griebner, F. Díaz, Laser Photon. Rev. 1 (2007) 179e212

ISBN: 978-81-954993-3-5
DOI: 10.21467/abstracts.122

Series: AIJR Abstracts