

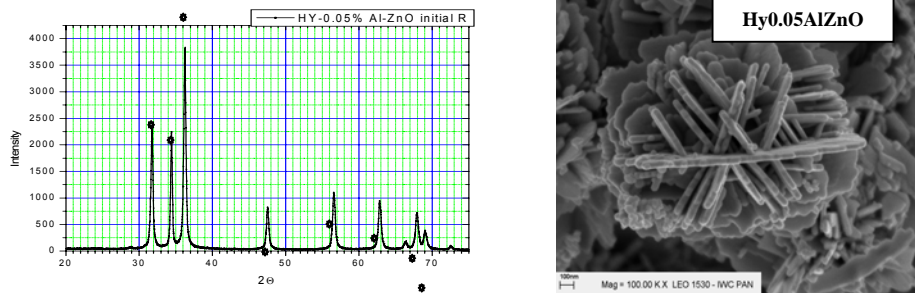
NEWS TRENDS IN SYNTHESIS OF NANOSTRUCTURED OXIDE POWDERS

PLAIASU Adriana Gabriela
University of Pitești
plaiasugabriela@yahoo.fr

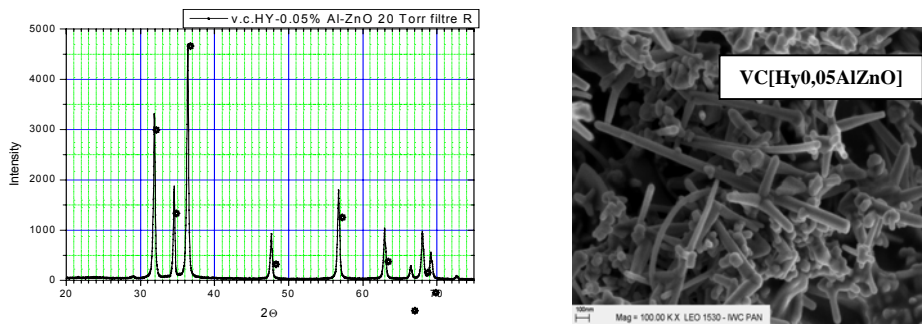
Key words: nanopowders, solar physical vapor deposition, XRD, SEM.

Abstract: New chemical methods such as hydrolyze, sol-gel process, hydrochemical synthesis or process in gaseous phase have been developed to synthesize nanostructured oxide materials. The classical routes for synthesis nanomaterials base on the solid state reactions at high temperature has many disadvantages due to the large diffusion distances. This paper presents the advantage of synthesis of oxide nanopowders by hydrothermal route and physical vapor deposition.

This paper is aimed at presenting the results we have obtained by synthesizing nanostructured zinc oxide powders doped with different Al content combining different procedures: the hydrothermal route and the evaporation-condensation in a solar furnace. The hydrothermal process is based on chemical reactions in aqueous solutions and contrarily the physical vapor deposition is a physical process in vapor state. The micrographs of powders are obtained by scanning electron microscopy.



a – hydrothermal method



b - solar physical vapor deposition

- Combining hydrothermal synthesis and solar PVD method is a powerful method to obtain nanophases with controlled composition and morphology (from flower-like structure to nanowhiskers).

BIBLIOGRAPHY

- [1] D. Segal, Chemical Synthesis of Advanced Ceramic Materials, Cambridge University Press, 1989.
- [2] R.W. Siegel, Nanophase Materials, Encyclopedia of Applied Physics, vol. 11, VCH Publishers, 1994, pag. 173-198.
- [3] Yan Xu H., Wang Hao, Yng C., Liang W.H., Man Kang Y., Hydrothermal synthesis of zinc oxide powders with controlled morphology, Ceramics International, 200, no.30, pag. 93-97.
- [4] Wang Zhong Lin, Nanostructures of zinc oxide, Materials today, 2004, pag 26-34.
- [5] Kouam J., Ait-Ahcene T., Plaiasu A.G., Abrudeanu M., Motoc A., Beche E., Monty C., Characterization and properties of ZnO based nanopowders prepared by solar physical vapor deposition (SPVD), Solar energy, Issue 3, 2008, pag. 226-238.
- [6] Schmidt-Mende I., MacManus-Driscoll J.L., ZnO-nanostructures, defects and devices, Materials Today, Vol.10, no.5, pag.40-48.