

Synthesis of undoped and M-doped ZnO (M Co, Mn) nanopowder in water using microwave irradiation

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Abstract: Undoped and M-doped ZnO (M Co, Mn) nanopowders have been successfully synthesized by microwave-assisted approach using $\text{Zn}(\text{NO}_3)_2 \cdot 2\text{H}_2\text{O}$ and NaOH. The results obtained from X-ray diffraction (XRD) analysis and the transmission electron microscopy (TEM) showed that the mean particle size was about 10-15 nm. The XRD analysis of the synthesized samples also showed a single phase ZnO structure without any additional phase. Magnetic property studies of the as-prepared M-doped ZnO (M Co, Mn) samples showed them to be paramagnetic material. However, thermal annealing in air of particular samples at 800°C for 3 h resulted in transforming the samples into a room temperature ferromagnetic material. © 2009 IOP Publishing Ltd.

Author Keywords: Microwave irradiation.; Mn); Nanopowder; Undoped and M-doped ZnO (M = Co

Year: 2009

Source title: Journal of Physics: Conference Series

Volume: 187

Art. No.: 12020

Link: [Scopus Link](#)

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ISSN: 17426588

DOI: 10.1088/1742-6596/187/1/012020

Language of Original Document: English

Abbreviated Source Title: Journal of Physics: Conference Series

Document Type: Article

Source: Scopus

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References:

- Glaspell, G., Dutta, P., Manirannan, A., (2005) J. Cluster Sci., 16, p. 523
- Khrenow, V., Schwager, F., Klapper, M., Koch, M., Mulen, K., (2007) Polymer Bull., 58 (6), p. 799
- Moghaddam, F.M., Saeidim, H., (2007) Mater. Sci. Eng., 139 (3), p. 265
- Hamedani, N.F., Farzaneh, F., (2006) J. Sci. Islamic Republic Iran, 17, p. 231
- Cullity, B.D., (1978) Elements of X-ray Diffraction, p. 102
- Liqiong, J., Dejun, W., Baiqui, W., Shudan, L., Baifu, X., Honggang, F., Jiazhong, S., (2006) J. Mol. Cat. A, Chem., 244 (2), p. 193
- Zhu, B.L., Zeng, D.W., Wu, J., Song, W.L., Xie, C.S., (2003) J. Mater. Sci., Material Electronics, 14, p. 521
- Shao, M., Li, Q., Xie, B., Wu, J., Qian, Y., (2002) Mater. Chem. Phys., 78, p. 288
- Cao, B., Cai, W., Li, Y., Sun, F., Zhang, L., (2005) Nanotechnology, 16, p. 1734
- Singh, P., Kumar, A., Kaushal, A., Kaur, D., Pandey, A., Goyal, R.N., (2008) Bull. Mater. Sci., 31, p. 573
- Denisov, A., Volk, Y.V., Malyarevich, A.M., Yumashev, K.V., Dymshits, O.S., Zhilin, A.A., Kang, U., Lee, K., (2003) J.Appl.Phys., 93, p. 3827
- Yang, S.G., Pakhomov, A.B., Hung, S.T., Wong, C.Y., (2002) IEEE Trans. Magnetics, 38, p. 2877