

Controlling the growth NiO nanoparticles

Cristiano T Meneses, Juliana M A Almeida, Erandir B Silva, José M Sasaki

*Departamento de Física, Universidade Federal do Ceará
Campus do Pici, CP 6030, 60455-760, Fortaleza, CE, Brazil*

Wladimir H Flores

*Centro de Ciências Exatas e Tecnológicas, Universidade Federal de
Pelotas/UNIPAMPACampus de Bagé, 96400-970, Bagé, RS, Brazil*

Nickel oxide has attracted attention of researchers due to its applications, when sizes of the particles are reduced, such as catalysis [1], electrochromic films [2]. Recently some researchers have discovery that NiO nanoparticles (NP's) with sizes enough reduced present large magnetic moments [3]. Several methods of synthesis have been used to obtain NiO NP's, most of them is sol-gel, relatively expensive when is compared with the method used in this and others works [4-5]. In this work, we show a new procedure to control growth of that NiO nanoparticles. This procedure consists in studies *in situ* and *ex situ* of X-ray diffraction, X-ray absorption. The XAS results were obtained in real time from dispersive X-ray absorption spectroscopy (DXAS) in the Ni K edge (XANES region) using the DXAS beam line at LNLS (Campinas, SP). The XRPD patterns at high temperature were recorded by the use of an image-plate detector in reflection geometry. For such experiments, the samples were heated using two heating rates (5 °C/min and 10 °C/min) and the temperature was kept constant in the isothermal at 500°C for 1 hour. These studies provide new insight in the production of NP's and confirm the capability of both techniques to follow the early stage of crystallization and growth of NiO NP's which will be useful for improving the particle size control in the process. It was realized also a study about pH effect in the precursor solution of the NP's. High resolution SEM micrographs will be showed for some particles obtained by this method. This work was partially funded by CNPQ and LNLS.

References

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