

## Study of the structural and morphology features of Bi<sub>2</sub>O<sub>3</sub> nanoparticles

M. Akhter and M.A.Shah\*

Special Centre for Nano science, Department of Physics,  
National Institute of Technology Hazratbal Srinagar-190006

\*Email: shah@nitsri.net

We have employed an improved and surfactant free approach for the synthesis of Bismuth oxide (Bi<sub>2</sub>O<sub>3</sub>) nanoparticles at very low temperature of 110 °C. This new approach is based on a reaction of bismuth powder and de-ionized (DI) water without the use of any additives or surfactants. The optical, photoelectrical and photoluminescence properties of bismuth oxide films prepared by thermal oxidation of bismuth thin films has been studied [1].

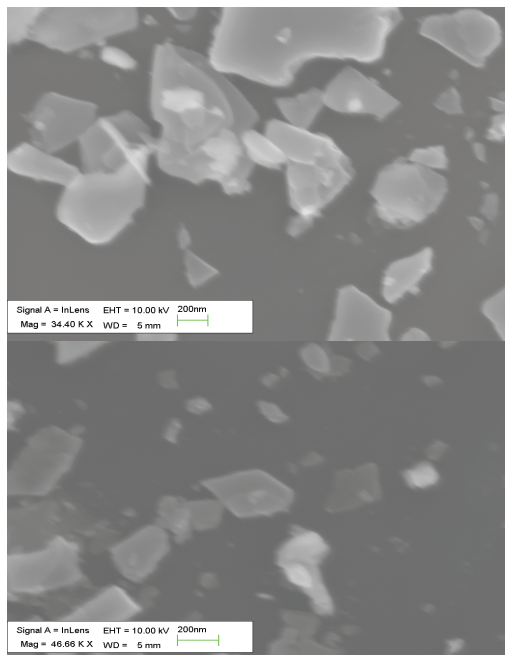
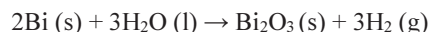


Figure 1: SEM images of Bi<sub>2</sub>O<sub>3</sub> nanostructures

In the present study, various methods are introduced for the synthesis of the nanoscale Bi<sub>2</sub>O<sub>3</sub> particles including sol-gel method [2]. Solvothermal synthesis of Bi<sub>2</sub>O<sub>3</sub> nanoparticles

has been achieved in order to control phase structure and morphology [3]. XRD and SEM have been employed to characterize the Bi<sub>2</sub>O<sub>3</sub> nanoparticles. By the morphological investigations using SEM, it was observed that the grown Bi<sub>2</sub>O<sub>3</sub> products are having dimensions in the range of 3 nm to 25 nm (figure 1). The reported method besides being organics free is economical, fast and free of pollution, which will make it suitable for large-scale production.

The formation of Bi<sub>2</sub>O<sub>3</sub> nanoparticles from the reagents of bismuth and de-ionized water can be explained with the help of facile reaction as follows:



It is observed that the grown product (Bi<sub>2</sub>O<sub>3</sub> nanoparticles) has different shapes like triangular, rectangular, spherical, etc.

**Keywords:** nanoparticles, morphological studies, structural studies

### References

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