Study of Structural and Optical Properties of Zirconium Oxide Nanoparticles

**aDimple Soni, bJaiveer Singh, bJitendra Tripathi, cAnupam Sharma and aNetram Kaurav**

aDepartment of Physics, Govt (Model, Autonomous) Holkar Science College, Indore (M.P.) India- 452001.

 bDepartment of Physics, ISR, IPS Academy, Rajendra Nagar, Indore (M.P.), India- 452012

 cDepartment of Physics, Manipal University Jaipur, Rajasthan, India 303007

Corresponding Author: jaiveer24singh@gmail.com

**Abstract**. In present study Zirconium dioxide (ZrO2) nanoparticles (NPs) were synthesized by using the chemical method. For the synthesis of desired NPs, oleyl amine (OA) was used as a surfactant material. OA plays a crucial role in inhibiting the aggregation of ZrO2 nanocrystals. Particle surface stabilisation is facilitated by it. The average crystallite size estimated from X-ray diffraction (XRD) using Scherrer equation, to be 6.15nm. UV-vis absorption spectra in the wavelength range of 200-900 nm were obtained; energy band gap obtained approximately 2.52 eV in as prepared ZrO2 NPs. Using FT-IR, the functional group and band structure of ZrO2 were studied.

References:

[1] Zeinab Fereshteh, Masoud Salavati-Niasari, Adv. Colloid interface Sci 243 (2017) 86-104.

[2] Masoud Salavati-Niasari, Mahnaz Dadkhah, Mohammad Reza Nourani, Alireza Amini fazl, J. Clust. Sci. 23 (2012) 1011-1017.

[3] R. G. Romanova & E. V. Petrova, Russ. J. Phys. Chem. 80 (2006) 974–979.

[4] A. Gossard, F. Grasland, X. Le Goff, A. Grandjean, G. Toquer, Solid State Sci. 55, (2016) 21-28.

[5] Shokry H., Elkady M., Hamad H., J. Nano Res. 56 (2019) 142-151.

[6] S. Sagadevan, J. Podder, I. Das, J. Mater. Sci. Mater. Electron. 27, (2016) 5622-5627.

[7] S. Sonal, B. Mishra, Chem. Eng. J. 424 (2021).

[8] C. Suciu, L. Gagea, A. C. Hoffmann, M. Mocean, Chem. Eng. Sci. 61, (2006) 7831-7835.

[9] Romina Arreche, Natalia Bellotti, Mirta Blanco, Patricia Vazquez, Procedia Material Science 9, (2015) 627-634.