

## Synthesis of zinc ferrite nano-particles from industrial wastes and its ability to remove selenium metal ion from waste water

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### Abstract

The purpose of this study is investigate the selenium (Se) removal efficiency of zinc ferrite nano-particles from Synthetic Waste Water. Single phase zinc ferrite ( $ZnFe_2O_4$ ) nano-particles with a mean crystallite size of 9-64 nm were prepared from industrial waste materials (steelmaking wastes) by co-precipitation method at low temperature (100 °C). Steelmaking wastes were characterized by XRF and XRD. The influence of ferrite synthesis condition such as the effect of annealing temperature on the crystallite size was investigated. The produced nano-powder was annealed at different annealing temperatures 150,300,500 and 850°C for 5h. It was characterized by X-ray diffraction (XRD), field emission scanning electron microscopy (FESEM) and transmission electron microscopy (TEM). The magnetic properties were demonstrated by vibrating sample magnetometer (VSM). Additionally, its adsorption rate was estimated with different conditions such as pH, sorbent masses and contact time. The results show that, The values of the quantities that were collected by VSM, such as saturation magnetization and coercivity field, were primarily dependent on the crystallite size whereas, with the increase in particle size, magnetization decreases. Zinc ferrite nanoparticles has good adsorption capacity for selenium.



### Biography:

Dr. Amira M. M. AMIN is a researcher in the Ceramic and Refractory Materials Department, Advanced Materials Division, Central Metallurgical Research & Development Institute (CMRDI), Egypt. She graduated from chemical engineering department, faculty of engineering, El-Minia university. She got her M.Sc in Chemical Engineering entitled "Porous Ceramic Based Cordierite From Waste Materials" and Ph.D. in Chemical Engineering entitled "Developing of Bioceramic Materials Based CaO-SiO<sub>2</sub> System" from Faculty of Engineering, El-Minia University. She has good experiences in processing, sintering

and characterization of dense and porousceramics including, bioceramics. She is very much interested in bioceramic materials



### Speaker Publications:

1. Amira M. M. Amin, Emad M. M.Ewais, Yasser M. Z.Ahmed, Eman A. Ashor, Ulrike Hess, Kurosch Rezwan "Zirconia Effect on the Bioactivity and the Mechanical Properties of Calcium Magnesium Silicate Ceramics at (CaO+MgO)\SiO<sub>2</sub>Molar Ratio Close to Unity", Journal of Bioceramics Development and Applications volume 6 issue 1 (2016).
2. Emad M. M. Ewais, Amira M. M. Amin, Yasser M. Z.Ahmed, Eman A. Ashor, Ulrike Hess, Kurosch Rezwan " Combined Effect of Magnesia and Zirconia on the Bioactivity of Calcium Silicate Ceramics at C\S ratio Less Than Unity," Journal of Material Science and Engineering C, Volume 70, Part 2, 1 January 2017, Pages 155–160.
3. YMZ Ahmed, ZI Zaki, RK Bordia, DHA Besisa, AMM Amin "Simultaneous Synthesis and Sintering of TiC/Al<sub>2</sub>O<sub>3</sub> Composite via Self propagating Synthesis with Direct Consolidation Technique", Ceramics International, Vol. 42, Issue 15, November 2016, 16589-16597.
4. Amira M. M. Amin and Emad M. M. Ewais, "Bioceramic scaffolds chapter in Scaffolding in Bioengineering-Materials, Technologies, Clinical Applications Book in INTECH.

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