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## **Biocompatible FeAl<sub>2</sub>O<sub>4</sub> nanoparticles: Synthesis, characterization, and amine functionalization for improved antibacterial properties**

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**H**ercynite (FeAl<sub>2</sub>O<sub>4</sub>) is an earth-abundant mineral with a cubic crystal structure and belongs to the normal spinel ferrites. The FeAl<sub>2</sub>O<sub>4</sub> (FAO) possesses excellent optoelectronic properties like optical absorption, electrical conductivity, superior magnetic and thermal properties, etc. Despite all these excellent properties, less attention was given to their nanoscale synthesis and functionalization for subsequent use in various applications. Herein, we have developed a low-cost synthesis methodology of nanosized FAO using a sol-gel method with advanced physicochemical properties. The nitrate salts of Fe and Al were used as precursors, and along with this, the citric acid was utilized as a chelating

agent cum fuel to achieve the phase of pure FAO nanoparticles (NPs). Furthermore, the superior colloidal dispersion stability of the FAO NPs was achieved and standardized via post-synthesis surface functionalization using amino-propyl-trimethoxy-silane (APTMS). All the developed materials were carefully characterized using various state of art characterization techniques for their structural, morphological, optical, magnetic, and thermal properties. Finally, the antimicrobial properties of FAO and FAO-APTMS NPs were investigated. The improved antimicrobial performance was noted after APTMS functionalization.

### **Biography**

Mrs. Swapnali Walake is a Junior Research Fellow at Symbiosis Centre for Nanoscience and Nanotechnology, Lavale, Pune, Symbiosis International (Deemed) University. She is currently working on development of magnetic nanomaterials for biological applications.

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