Annotations of Doctoral Thesis Topics for Degree Course in ‘‘Nanotechnology and Advanced Materials’’ for the Academic Years since 2019/2020

Topic: **Preparation and Characterization of Advanced Spinel Ferrite Nanocomposites for Electromagnetic Application**

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Annotation:

This work will be focused on the formation of spinel ferrite nanoparticles and further its nanocomposites with graphene and polymer. The prepared nanocomposites with spinel ferrite nanoparticles and graphene as nano-fillers in polymer matrix will be characterized for electromagnetic interference shielding effectiveness/ microwave absorption characteristics. In addition, the prepared nanocomposites will be investigated in details for its structural and physical properties to find a correlation with electromagnetic interference shielding effectiveness for the development of advanced spinel ferrite nanocomposites for electromagnetic interference shielding application.

Requirements:

Talented, enthusiastic and motivated candidate with a Masters’ Degree in Physics/Chemistry/Material Science/Nanoscience and Nanotechnology or related subject areas. Good command of English or a potential to the improvement. Experience with spinel ferrite nanoparticles and its nanocomposites is welcome though not mandatory.

Literature:

1. YADAV, R.S.; KURITKA, I.; VILCAKOVA, J.; HAVLICA, J.; KALINA L.; URBANEK, P.; MACHOVSKY, M.; SKODA, D.; MASAR, M.; HOLEK, M. Sonochemical synthesis of Gd^{3+} doped $CoFe_2O_4$ spinel ferrite nanoparticles and its physical properties. Ultrasonics – Sonochemistry, 2018. Vol.40, pp.773–783. ISSN: 1350-4177.
2. YADAV, R.S.; KURITKA, I.; VILCAKOVA, J.; URBANEK, P.; MACHOVSKY, M.; MASAR, M.; HOLEK, M. Structural, magnetic, optical, dielectric, electrical and modulus spectroscopic characteristics of $ZnFe_2O_4$ spinel ferrite nanoparticles synthesized via honey-mediated sol-gel combustion method. Journal of Physics and Chemistry of Solids, 2017. Vol. 110, pp. 87-99. ISSN: 0022-3697.
3. YADAV, R.S.; KURITKA, I.; HAVLICA J.; HNATKO, M.; ALEXANDER, C.; MASILKO, J.; KALINA, L.; HAJDUCHOVA, M.; RUSNAK, J.; ENEV, V. Structural, magnetic, elastic, dielectric and electrical properties of hotpress sintered $Co_{1-x}Zn_xFe_2O_4$ (x = 0.0, 0.5) spinel ferrite nanoparticles. Journal of Magnetism and Magnetic Materials, 2018. Vol. 447, pp. 48-57. ISSN 0304-8853.
4. IDRIS, F. M.; HASHIM, M.; ABBAS, Z.; ISMAIL, I.; NAZLAN, R.; Ibrahim, I. R. Recent developments of smart electromagnetic absorbers based polymer-composites at gigahertz frequencies. Journal of Magnetism and Magnetic Materials, 2016. Vol. 405, pp. 197-208. ISSN 0304-8853.
5. MENG, F.; WANG, H.; HUANG, F.; GUO, Y.; WANG, Z.; HUI, D.; ZHOU, Z. Graphene-based microwave absorbing composites: A review and prospective. Composites Part B, 2018. Vol. 137, pp. 260-277. ISSN: 1359-8368.