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Investigation of antimicrobial activities and mechanism of silver nanoparticles synthesized from aerial roots of Rhaphidophora aurea (Linden ex Andre) extract

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Silver nanoparticles were successfully prepared by eco-friendly and cost effective aerial roots of *Rhaphidophora aurea* (Linden ex Andre) extract which act as a reducing agent by green synthesis method. The visual color change from colorless to yellow to brown was helpful in confirmation of AgNPs formation. UV Visible (UV-vis) spectroscopy was used to follow the gradual formation of NPs and power X-ray diffraction (XRD) confirmed the face centre cubic crystal structures in software in JANA2006, Edit+3. XRD studies revealed a gradual crystal-lite size reduction at different molar ratios of extract silver salt. The crystallite size was calcu-lated using Debye-Scherer's formula and found to be in the range 30 nm. Morphology and characterization of AgNPs was done by using FESEM, HRTEM, FTIR and EDAX tech-niques. FESEM and HRTEM analysis showed that the morphology of the obtained AgNPs was spherical shaped which can be used in variety of biomedical and pharmaceutical applica-tions. The antibacterial actives and mechanism of silver nanoparticles are examined using *Escherichia coli, Streptococcus mutants, Bacillus subtilis and Pseudomonas aeruginosa re*-spectively by analyzing the growth permeability and morphology of the bacterial cells follow-ing with AgNPs.

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Disorder magnetic behavior of diluted Cu1-xZnxFe2O4 (x= 0.6 - 1.0) ferrites

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Ferrites with spinel structure represent the magnetic disorder and exchange frustration among A & B-site moments resulting in a wide spectrum of magnetic structure such as ferrimagnetism (FM), antiferrimagnetism (AFM), local canted spin (LCS), re-entrant spin glass (RSG) and spin glass (SG). Disorder behavior of Cu1-xZnxFe2O4 (x=0.6, 0.7, 0.8, 0.9 and 1.0) ferrites have been investigated by studying field-cooled (FC) and zero-field-cooled (ZFC) DC magnetization, temperature and frequency dependence of complex AC susceptibly, aging, rejuvenation and memory effect and magnetocaloric effect. The FC and ZFC magnetization and complex AC susceptibility studies suggest the presence of a magnetic phase transition from a ferromagnetic (FM) to a spin glass (SG) at a low temperature. Samples x=0.9 & 1.0 shows typical spin glass behavior with the manifestation of non-equilibrium dynamics of the spin glass such as aging, rejuvenation and memory effects. The magnetocaloric effect is observed in samples x=0.6, 0.7 & 0.8 near Curie temperature, Tc at which maximum magnetic entropy change (ΔS) occurs suggesting as a magnetic refrigerant materials. These features of the magnetic properties of dilute Cu-Zn ferrites are discussed from the view point of the above mentioned various type of disorder.

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