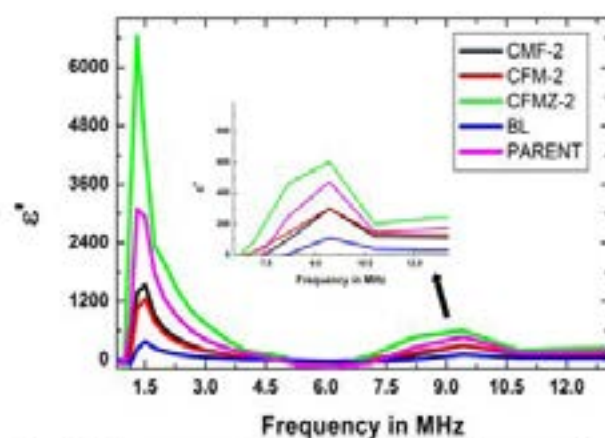


Study of structural and magnetic properties of manganese doped cobalt ferrite nanoparticles for high frequency and sensor applicationsFeroz A Khan¹ and M Z Ahsan²¹Bangladesh University of Engineering and Technology, Bangladesh²Military Institute of Science and Technology, Bangladesh

The structural, magnetic and electrical properties of Mn doped cobalt ferrites $\text{Co}_{1-x}\text{Mn}_x\text{Fe}_2\text{O}_4$ have been investigated. The samples are found to be of spinel structure. The DC and AC magnetic properties have been measured at different temperatures. A significant change in the electrical and magnetic properties has been observed with increasing Mn content in the sample. It is observed that the ferri-ferromagnetic Curie temperature is tunable by changing the Mn content in the sample. The optimum point is yet to be determined as the research work is in progress. However primary investigation shows that for transition from ferri-to-ferro and ferri-to-para the bifurcation point shifts towards the low temperature side. The ac electrical properties have also shown strong frequency dependence. The variation of real part of the dielectric constant ϵ' with frequency at room temperature for all samples of composition $\text{Co}_{0.75}\text{Mn}_{0.25}\text{Fe}_2\text{O}_4$ (CMF2), $\text{Co}_1\text{Mn}_{0.25}\text{Fe}_{1.75}\text{O}_4$ (CFM2), $\text{Co}_{1.25}\text{Mn}_{0.25}\text{Fe}_{1.75}\text{O}_4$ (CMFZ2), CoFe_2O_4 (parent) and also of a bi-layer sample CMF-2+CFM-2. It is observed that the dielectric constants of all the investigated samples have gone through a maximum at two different frequency bands 1 MHz- 4.5 MHz and 7.5 MHz.-10.5 MHz. This is attributed to the electronic, ionic, dipolar and interfacial polarizations that occur at the tetrahedral and octahedral sites.

**Fig.1 : Frequency dependent dielectric constant****Biography**

Feroz A Khan has completed his PhD degree from the Bangladesh University of Engineering and Technology (BUET) and his Postdoctoral research at the University of Delaware, USA, University of Uppsala, Sweden, and the University of Tsukuba, Japan. He is a Professor in Physics at the Bangladesh University of Engineering and Technology (BUET). He is a Leader of a research group called Dhaka Materials Science Group under scientific research collaboration with the International Science Programs (ISP), Uppsala University, Sweden. He has supervised more than 25 Postgraduate degrees that includes Masters, MPhil, and PhD degrees. He has to his credit more than 50 research publications. He is involved in promoting the basic science research through establishment of regional research collaborations with the south-east Asian Universities under the umbrella of International Science Programs.

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