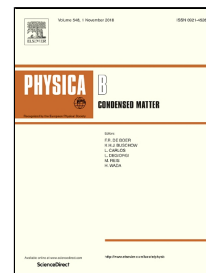


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Effect of zinc on structure, optical and magnetic properties and magnetic heating efficiency of $\text{Mn}_{1-x}\text{Zn}_x\text{Fe}_2\text{O}_4$ nanoparticles

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Abstract. $\text{Mn}_{1-x}\text{Zn}_x\text{Fe}_2\text{O}_4$ ($0 \leq x \leq 0.7$) nanoparticles were synthesised by a hydrothermal process. X-ray diffraction patterns reveal that all samples have spinel crystalline structures. Scanning electron microscopy and X-ray diffraction patterns show that nanoparticles are near-spherical in morphology and their average size is 13-45 nm. The elemental analysis was carried out by energy dispersive X-ray analysis technique. The optical direct band gap of $\text{Mn}_{1-x}\text{Zn}_x\text{Fe}_2\text{O}_4$ nanoparticle decreases from 2.38 to 1.88 eV as the Zn content increases. Moreover, the saturation magnetisation at room temperature tends to decrease with increasing Zn content. The specific absorption rate (SAR) values were measured at a fixed frequency of 178 kHz with

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