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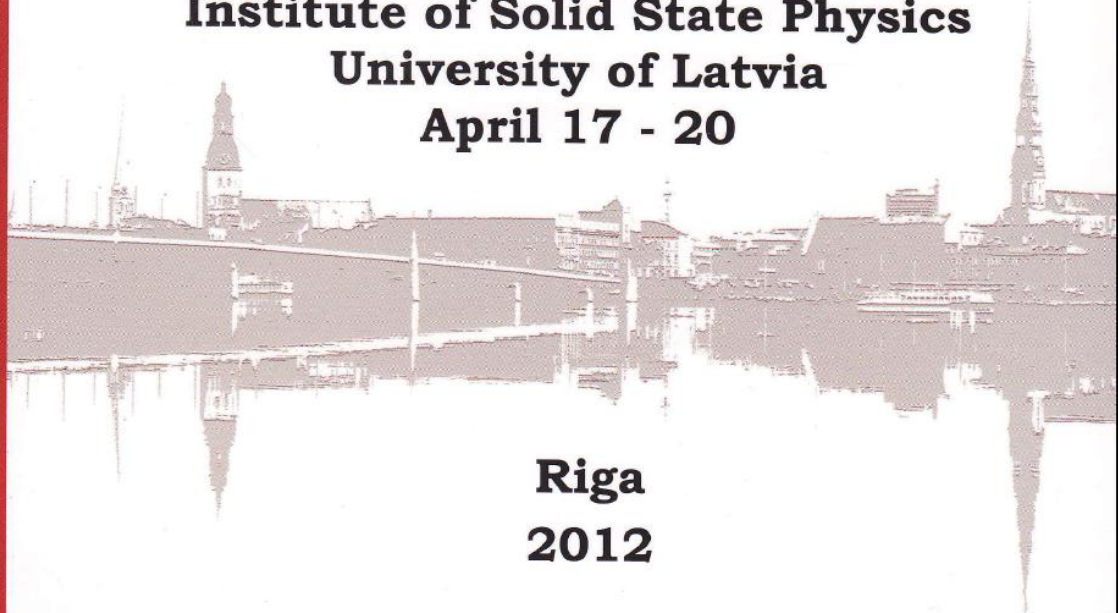

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Magnetic and Electric Field Effects on the Growth of Ferrite Films in Spray Pyrolysis Process

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Functionalized magnetic nanoparticles are technologically important materials with a wide range of applications, such as magnetic storage and microwave devices, gas sensing devices, for biorecognition and medical diagnostics. Nanocrystalline zinc ferrite is also of considerable interest in both research and technological fields due to its unique magnetic properties due to the dominant role of the surface magnetic ions that differ substantially from their bulk counterparts. Spray pyrolysis method make it possible to change the cation distribution and crystallite size of mixed metal ferrite thin film coatings, affecting their magnetic and catalytic properties.

Experimental setup is made in our work to investigate the influence of magnetic and electric field on spray pyrolysis thin film growth process. The structure, morphology, magnetic and optical properties of different thin $ZnFe_2O_4$ films are investigated with X-ray diffractometer, X-ray fluorescence (XRF) spectrometer, Raman scattering spectrometer, SEM and optical microscopes, magnetic susceptibility stand, spectrophotometer. The growth mechanism of nano-grains on hot substrate includes the nonequilibrium process which enables the formation of a variety of meta-stable phases (Zn and Fe interstitials, changing coordination number of oxygen around the cation) what lead to a random distribution of Zn and Fe ions on the tetragonal (A) and octahedral (B) crystal sites.

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