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Synthesis and characterization of nanocrystalline RE-substituted (RE=La, Ce, Gd, Dy, Er, Yb) Mn-Zn ferrites TATIANA BRUSENTSOVA, ROBERT PEALE, University of Central Florida, Dept. of Physics, NIKOLAY KHOKCHLATCHEV, VIATCHESLAV KUZNETSOV, Mendeleyev University of Chemical Technology of Russia, UCF, DEPT. OF PHYSICS TEAM, MUCTR TEAM — Nanocrystalline ferrites $Mn_{0.6}Zn_{0.4}Fe_{2y}RE_yO_4$ (RE=La, Ce, Gd, Dy, Er, Yb; y=0; 0.1; 0.2; 0.3) were synthesized by chemical co-precipitation method. The formation of FCC spinel structure and absence of impurity phases within each of the sample was confirmed by X-ray diffraction analysis. The cationic distribution within ferrites was obtained by atomic emission spectroscopy. Mean particle size calculated by Scherrer's formula from XRD data of dried powders (∼10 nm) is in good agreement with one showed by transmission electron microscopy of the initially obtained particles in a diluted aqueous solution. Scanning electron microscopy confirmed the nanocrystalline morphology of the dried ferrite powders. Magnetic measurements in a temperature range 4 – 393 K showed a typical superparamagnetic behavior, like non-hysteretic M(H) curves and a blocking temperature on M(T) dependencies. Infrared transmission spectra have been investigated in a range 40-3500 cm^{-1}. All spectra show a typical for cubic spinel lattice double peak in far IR, corresponding to the stretch-type vibrations on Me-O bonds in octahedral and tetrahedral sublattices.

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