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The X-band electron paramagnetic resonance of  $Gd^{3+}$  ion doped in the diamagnetic  $LaF_3$  nanoparticles at a room temperature was investigated. The four nanosized  $LaF_3:Gd^{3+}$  samples 1, 2, 3 and 4 were synthesized using different time of hydrothermal reaction [1,2]. In typical synthesis, lanthanum oxide is dissolved in nitric acid solution. Then, after filtering, NaF (F:La with 0,5% Gd = 3:1) was added into the above solution under violent stirring. The pH of the suspension was adjusted by ammonia to about 4.0-5.0 value. After stirring for 20 min, the suspension was placed in the microwave oven (650 W) for the further hydrothermal reaction. The suspension was heated by microwave irradiation at 70% of the maximum power under refluxing for 0, 20, 40, and 420 min (samples numbers 1, 2, 3 and 4 respectively). The resulting product was collected by centrifugation and washed several times in deionized water. The X-ray experiments showed high crystallinity of synthesized samples. The micron-sized sample was prepared by milling of a single crystal  $LaF_3:Gd^{3+}$ .

The X-band EPR of  $Gd^{3+}$  ion has been observed in  $LaF_3:Gd^{3+}$  powders at the room temperature. The EPR spectra (Fig.1) were obtained at Bruker ESP-300 spectrometer. Influence of the sample size and hydrothermal reaction duration on obtained spectra is observed. Current EPR studies on doped  $LaF_3$  powders will be reported.

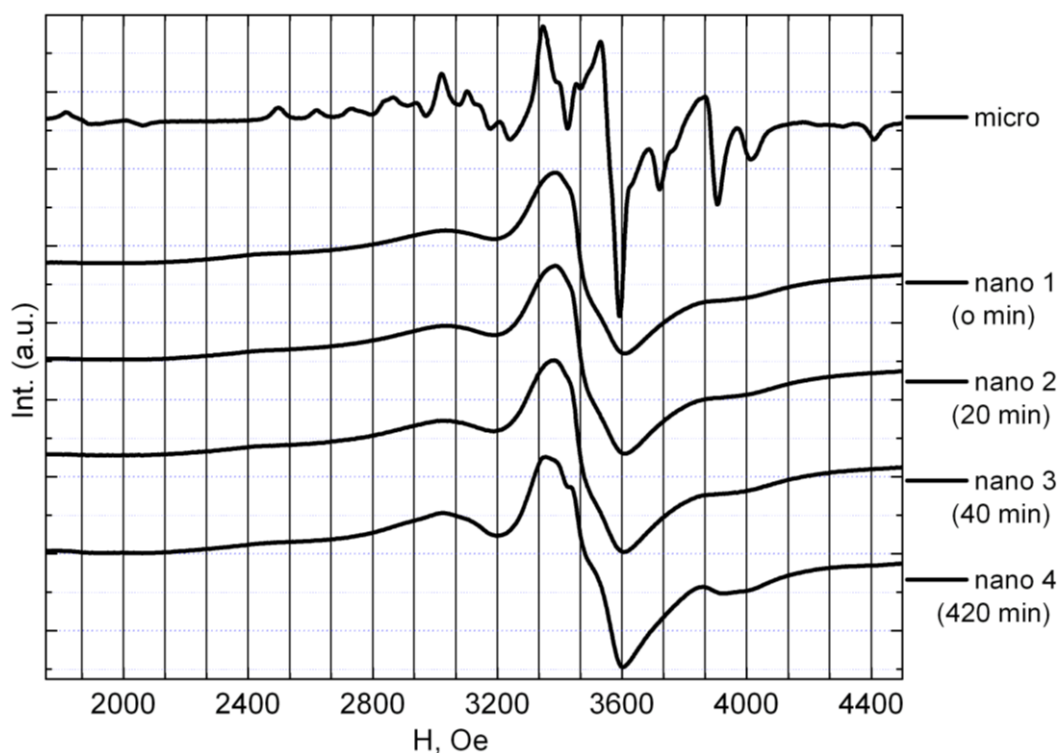


Fig.1 EPR spectra of nano- and micro- sized powders  $LaF_3:Gd^{3+}$ .

[1] L. Ma et al., JETP Lett., 86, 416 (2007).

[2] E.M. Alakshin et al., J. Low. Temp. Phys., 162, 645 (2011).