

## MAGNETIC PROPERTIES OF NANOCRSTALLINE BaFe<sub>12</sub>O<sub>19</sub> PREPARED BY HYDROTHERMAL METHOD

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Nanocrystalline BaFe<sub>12</sub>O<sub>19</sub> with average grain size of 8.9-15.3nm has been successfully synthesized by hydrothermal method. X-ray diffraction and energy dispersive X-ray spectroscopy measurements show that the obtained materials are formed of single-phase particles with a perfect chemical purity and a correct stoichiometric ratio. The particle size of nanocrystals depends on the preparation conditions. It increases from 8.9 to 15.3 nm when the materials are synthesized during 12 hours, but changing the synthesis temperature from 140°C to 200°C. On the other hand, the average particle size increases from 7.8 to 12.4nm when keeping the synthesis temperature constant at 170°C and changing synthesis duration from 3 to 12 hours. From the transmission electron microscope images, we observed that the materials are composed by both stick-like and plate-like particles, which can be separated using a centrifugation with appropriate rotations number and solvent. The preliminary results showed that the magnetic properties depend on the shape and size of particles. At 4.2 K, the coercivity value varies from 0.1 up to 0.15 T, the saturation magnetization from 30 up to 39 emu/g and at room temperature, the superparamagnetic behaviour is observed.