

## Magnetic properties of monophasic $\epsilon - Fe_2O_3$ nanoparticles system.

A.A. Dubrovskiy<sup>b</sup>, O.N. Martyanov<sup>a</sup>, D.A. Balaev<sup>b</sup>, K.A. Shaykhutdinov<sup>b</sup>, S.S. Yakushkin<sup>a</sup>, and G.A. Bukhtiyarova<sup>a</sup>

<sup>a</sup>Boriskov Institute of Catalysis SB RAS, Russia, Novosibirsk

<sup>b</sup>Kirensky Institute of Physics SB RAS, Russia, Krasnoyarsk

In this work the results of investigation of magnetic properties of ultra small size ( $2 \div 5nm$ )  $\epsilon - Fe_2O_3$  nanoparticles embedded in silica matrix are presented. This system is superparamagnetic with blocking temperature about  $\approx 120K$ . In region of high temperatures nanoparticles show ferrimagnetic behavior with Curie temperature about  $\approx 800K$ .

Additionally, in the low temperatures region the strong paramagnetic signal is observed. This paramagnetic signal is conditioned by  $\epsilon - Fe_2O_3$  particles of the smallest size (2 nm), in which the magnetic ordering is unlikely due to less quantity of iron atoms.