

# A Henkel plots computer modeling of an exchange coupled isotropic single-domain ensemble

A. Bolyachkin<sup>1</sup> and A. Volegov<sup>1</sup>

<sup>1</sup>*Ural Federal University named after First President of Russia B.N. Yeltsin, Yekaterinburg, Russia*

A Henkel plot technique is widely used for an analysis of single-domain isotropic magnetic ensembles from the point of view of interactions between its elements. It based on a comparison of relations between normalized isothermal remanent magnetization  $m_r(H)$  and dc demagnetization remanence  $m_d(H)$ , which characterized by  $\delta M$ , for investigated objects and Stoner-Wohlfarth ensemble of small noninteracting particles [1]. In a compliance with recent works [2] a positive contribution to the  $\delta M$  is considered as a result of exchange interaction. Nevertheless any quantitative analysis of Henkel technique have not been done reliably yet. In presented work dependence of Henkel plots maximums and intergrain exchange interaction in uniform ensemble of grains is studied using computer modelling methods. A functional dependence of  $\delta M$  maximum value on the intergrain exchange interaction constant is proposed. In aims of experimental verification material parameters ( $J_s$ , exchange constant  $A_{IEI}$  and magnetocrystalline anisotropy  $K$ ) for  $\text{Nd}_2\text{Fe}_{14}\text{B}$  are used.

## References:

- [1] P.E. Kelly, K.O'Grady et al., IEEE Trans. Magn. 25, 3881 (1989)
- [2] H. Zhang, C. Rong et al., Appl. Phys. Lett. 82, 4098 (2003)