

Theory of anhysteretic remanent magnetization of randomly oriented single-domain grains

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A generalization of the theory of formation of anhysteretic remanent magnetization (ARM) for non-interacting randomly oriented uniaxial single-domain (SD) grains is developed. The results obtained justified the approximations for ARM intensity presented earlier by [1 - 3]. However, the calculations revealed a striking discrepancy between the theoretical conclusions and the experimental results reported in literature. As it follows from the theory, the intensity of ARM is several times higher than the intensity of TRM, while experiments indicate the opposite relationship between ARM and TRM. The general conclusion is that in order to resolve this discrepancy and to understand the mechanism of ARM formation in rocks, it is necessary to supplement the theory presented here with consideration of magnetostatic interactions. On the experimental side, it needs to conduct experiments to create ARM and TRM in ensembles of non-interacting grains, that is, at extremely low concentrations in the sample. The study was carried out using the Russian Science Foundation's Grant No. 23-27-00290, <http://rscf.ru/en/project/23-27-00290/>.

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