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Conduction ESR Study of Graphite Intercalation Front

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The conduction ESR (CESR) technique is one of the most powerful methods for studying the graphite intercalation process, because shapes and intensities of the CESR signal both from non-intercalated and intercalated regions of graphite plate vary strongly during the intercalation. This work is devoted to the results of an *in situ* CESR study of HNO_3, SbF_5, Br_2 and F_2 molecules intercalation into narrow graphite slab.

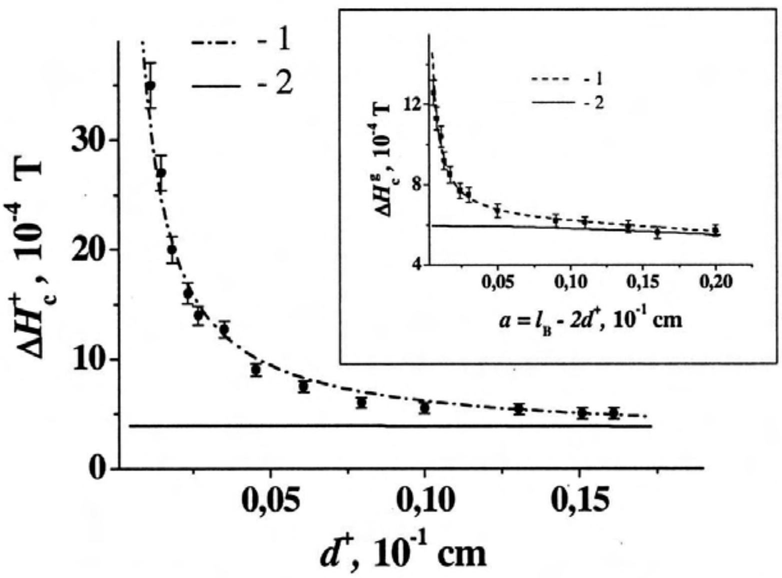

Figure. The experimental (dots) and theoretical (lines) values of CESR linewidth, ΔH_c^+ (ΔH_c^g), vs. average thickness, d^+ (a), of intercalated (non-intercalated) parts of narrow graphite slab. The dashed (solid) lines were calculated with the non-zero (zero) values of average spin reorientation probabilities during the collisions of current carriers with the front of graphite intercalation by antimony pentafluoride molecules.

In all experiments the narrowing (broadening) of the CESR signal at the beginning (at the end) of intercalation of narrow graphite slab have been clearly detected. Under the assumption that the CESR signal evolution is caused by the advance of the boundary separating the intercalated and non-intercalated parts of graphite, the average value of spin reorientation probability ε during the collision of current carriers with this interface and the constant of two-dimensional diffusion of intercalate molecules into graphite galleries have been extracted from experimental data by calculations. It was found that the value of ε depends on the nature of intercalate, experimental conditions and the side of collision of current carriers with the front of reaction.

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