

# Changes in Aspect Ratio of Nanocrystalline Grains of Electrodeposited NiFe<sub>1-x</sub> Thin Films Induced by Electric Fields inside Microscratches Produced on a Copper Cathode

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## Abstract

NiFe thin films near Permalloy<sup>TM</sup> composition were electrodeposited on microscratched copper sheets cathodes with and without acid saccharine, a known stress releaser. Parallel microscratches arose when mechanically polishing the copper cathode surface in a unidirectional way using an adequate diamond paste. Such scratches can be approximated by microdihedra with nanometric deepness averaging around 200 nm, with large dispersion. Typical top widths of main scratches were around 1  $\mu\text{m}$ , what implied in wide aperture angles. Scratches geometry induced local electric charge and field distributions on the surface. Electrodeposition on such electrical conformation implied on shortening of grains towards electric field direction, or equivalent, transversally to scratches. These observed effects were more pronounced when using baths with no addition of saccharine. The results were compared with an equivalent film deposited on a non-structured copper evaporated plane film.