Latent Segregated Microstructure and its Growth Process as Revealed by Chemical Etching

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Latent segregated microstructures can be revealed by selective chemical etching with dilute aqua regia. Bright and dark regions correspond to the preferentially dissolved Co-rich regions and the remaining Cr-rich regions. These microstructures suggest compositional separation within grains and grain-boundary Cr enrichment, making them suitable for high-density recording media.

Photo a: typical segregated microstructure in an rf-sputtered 600nm-thick Co-18at%Cr film. Photo b: segregated microstructure growth as a function of thickness in rf-magnetron sputtered Co-22at%Cr films; the microstructure continuously changes from a "striped" to a "core and ring" structure; the segregated microstructure model is shown at the bottom right.

[Ref] Y.Maeda and M.Asahi, J. Appl. Phys., 61 (1987) 1972.

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