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TEM EXAMPLE

XTEM of brittle magnetic film on PET

XTEM specimen preparation can be challenging for, e.g., samples composed of materials with very different properties, such as the example given in this application note. It displays a TEM image at low magnification of a brittle metal film with columnar structure (CoCr) which was deposited on a flexible plastic tape (PET).

As epoxy resin ARALDIT (see Ref. [1]) was used to make the cross-section sandwich. GATAN G1 in Ref. [2], and later work. Care was taken to stop the dimpling stage at the right moment, i.e., *not too thin*, to avoid mechanical damage of the fragile plastic substrate.

Finally, performing argon ion milling with an incidence angle as low as possible, in this case 1.5 - 3 degrees in the final stage. Moreover, the ion thinning process was stopped *just before* the formation of an etch hole.

It is essential in this case that the operator keeps his/her eye continuously on the ion thinning process.

In Ref. [2] we have been able to show electron transparency beyond 6 micron by applying the technique of Dimple Grinding / Polishing and Argon ion etching.

[1] E.G. Keim, M.D. Bijker and J.C. Lodder, in the **J. Vac. Sci. Technol. A 19(4), Jul/Aug 2001**.

[2] Keim, E.G., Nguyen L.T., Lodder J.C., *"Preparation of cross-sectional TEM specimens of obliquely deposited magnetic thin films on a flexible tape; electron transparency beyond 6 micron!"*, **Proceedings Microscopy & Microanalysis 2002 Meeting, Quebec City, Quebec (CA), August 4 - 8, 2002, pages 1346CD-1347CD. ISBN 0-521-82405-2.**