

## MFM Analysis of Magnetization Reversal in Patterned Media

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Recording on patterned media is widely studied as a potential candidate for ultra-high-density magnetic recording [1]. In the case of patterned media, two problems have emerged gradually. Firstly, since each bit consists of one island, it is important to understand the magnetization reversal process of each dot. Secondly, it is necessary to quantitatively study the influence of magnetostatic energy on magnetization reversal process of a patterned medium with a distribution of geometrical dimension of island, particularly when the dot size becomes smaller and smaller.

A dot-by-dot AFM/MFM analysis is developed and applied to study the magnetization reversal process of a patterned CoCrPt medium through evaluating the magnetostatic energy of each dot quantitatively. Examples of in-situ MFM observation are shown in Fig. 1. The three-dimensional size, magnetization state, experimental coercivity and intrinsic coercive field of islands are evaluated by this means. Taking account of the magnetostatic interaction dot by dot, the spread of intrinsic coercivity of dot (Fig. 2) and intrinsic demagnetization curve of the medium were obtained.

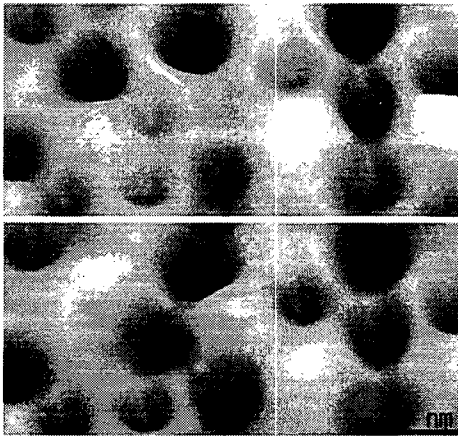


Fig. 1 The MFM images observed in external field of 2 kOe (the top) and 3 kOe (the bottom) for the same area.

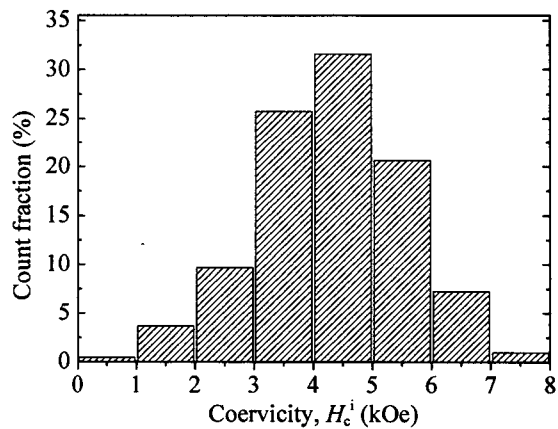


Fig. 2 The spread of intrinsic coercive field of dot in the patterned medium.

### References

- [1] A. Moser, K. Takano, D.T. Margulies, M. Albrecht, Y. Sonobe, Y. Ikeda, S. Sun, and E.E. Fullerton, J. Phys. D, 35, R157 (2002).