

**TRACK EDGES IN METAL-EVAPORATED TAPE
AND THIN METAL-PARTICLE TAPE**

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Introduction

The demands for high-density storage capacity encourage the study of narrow track width recording, overwrite behavior and track edges on media. In this work the central question is whether the existing tape media (ME or MP tape) are differing with respect to the track edges. We investigated the details of the edge of tracks and looked at the signal, noise and overwrite behavior of the medium.

Experimental

Commercial MP and single layer Hi8 ME tapes are used to look at the track edges. Both have saturation magnetizations of 365 kA/m and switching field distributions of 0.22. MP tape has further a squareness (S) of 0.89 and coercivity (Hc) of 195 kA/m. ME tape on the other hand has S = 0.97 and Hc = 100 kA/m. For recording the head used is a MIG head with 20 turns, gaplength of 0.22 μm and a track width of 5 μm. On a part of a 2 μm signal a 0.5 μm signal is written by a recording set-up. The optimum current is determined at 0.5 μm. With magnetic force microscopy (MFM) the details of the created magnetic patterns are observed. A single domain EBID tip [1], with dimensions 1 μm x 30 nm x 80 nm, is used for this purpose. The 30 nm side is the scan direction.

Results and Analysis

It is known that these two media have different internal structure and interaction mechanisms. ME tape has an well-oriented tilted columnar structure, resulting in a high orientation factor [2], while MP tape consists of dispersed particles in a binder (see Fig.1). These microstructural differences are thought to be important for the understanding of the magnetic recording characteristics. Fig. 2 shows two MFM pictures taken on ME tape (left one) and MP tape (right one). Below these pictures a mean value is calculated from the MFM picture which is a measure for the cross-track signal. MP tape shows gradual increase in its mean value compared to ME tape. At the bottom the calculated standard deviation (STD) is given which is a measure for the noise. The peaks at the track edges of ME tape are more pronounced than MP tape. In the paper all these effects will be explored more extensively.

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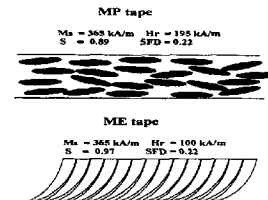


Fig.1 Characteristic internal structure of ME and MP tape.

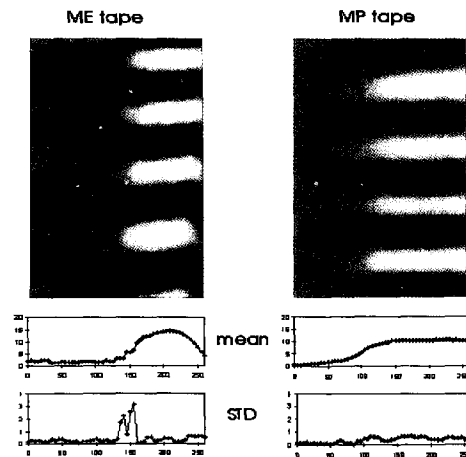


Fig.2 MFM pictures of ME and MP tape with the calculated mean-value and its standard deviation.

References:
 [1] S. Porthun et al., J. Magn. Magn. Mater. 182 (1998) 238-273
 [2] S.B. Luitjens et al., J. Magn. Magn. Mater. 155 (1996) 261-265