

## PREPARATION OF FERRITE-COATED MFM CANTILEVERS.

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Ferrite-coated MFM cantilevers were prepared for the use with a high-frequency MFM (HF-MFM) setup. As a basis for these probes, we employ commercial, micromachined Si cantilevers (Nanoworld Services). The ferrite coatings were fabricated by means of RF magnetron sputtering directly on the Si surface. Two types of ferrites were employed in this study: NiZnFe<sub>2</sub>O<sub>4</sub> spinell as well as Co<sub>2</sub> Z-type hexaferrite (Ba<sub>3</sub>Co<sub>2</sub>Fe<sub>24</sub>O<sub>41</sub>, BCFO). The typical thickness of the coatings was 50 nm. Additionally, films with thickness up to 100 nm were prepared. The ferrite structure was subsequently formed by annealing in air at 800°C and 1000°C. The ferrite coatings were characterized by means of X-ray analysis and SEM/EDX. Furthermore, magnetic hysteresis loops were measured by VSM at room temperature. The performance of the ferrite-coated tips was tested in MFM imaging, yielding good imaging properties. For comparison, ferrite samples on (100) and (111)-oriented Si substrates (analogous to the surfaces of the cantilevers) were prepared. On these samples, MFM investigations of domain structures were carried out.

Successful HF-MFM imaging was performed with both types of cantilevers using harddisk writer poles as samples [1]. The HF-MFM images obtained by ferrite-coated cantilevers evidently reveal more details of the magnetic field distribution of the writer poles up to the GHz range than conventional CoCr-coated MFM cantilevers.

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