

MAGNETIC FORCE MICROSCOPY

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This review on magnetic force microscopy does not provide an exhaustive overview of the past accomplishments of the method but rather discusses the present state of the art. Magnetic force microscopy is a special mode of noncontact operation of the scanning force microscope. This mode is realized by employing suitable probes and utilizing their specific dynamic properties. The particular material composition of the probes and the dynamic mode of their operation are discussed in detail. The interpretation of images acquired by magnetic force microscopy requires some basic knowledge about the specific near-field magnetostatic interaction between probe and sample. The general magnetostatics as well as convenient simplifications of the general theory, which often can be used in practice, are summarized. Applications of magnetic force microscopy in the magnetic recording industry and in the fundamental research on magnetic materials are discussed in terms of representative examples. An important aspect for any kind of microscopy is the ultimately achievable spatial resolution and inherent restrictions in the application of the method. Both aspects are considered, and resulting prospects for future methodical improvements are given.