Functionalization of atomic force microscopy Akiyama tips for magnetic force microscopy measurements

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We have investigated a method to functionalize atomic force microscopy Akiyama tips, for application in magnetic force microscopy experiments. Magnetic tip-shaped structures were grown on Akiyama tips using focused electron beam induced deposition of cobalt. After exposure to ambient air, the grown tips have a Co content of 85%. The prepared magnetic tips were characterized using electron dispersive X-ray spectroscopy and scanning electron microscopy. In order to investigate the magnetic properties, such as effective magnetization or the coercive field, current loops, prepared by electron beam lithography, were used. Measurements at room as well as at low temperature (T = 4.2 K) were carried out, and compared with simulation. Magnetic Akiyama tips open new possibilities for low-temperature magnetic force microscopy measurements.