

## Magnetization Process and Domains in MTJ

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The magnetization process in as deposited and annealed junctions of Si(100)/Ta(5)/Cu(10)/Ta(5)/NiFe(2)/Cu(5)/IrMn(10)/CoFe(2.5)/Al-O/CoFe(2.5)/NiFe(t)/Ta(5), where  $t = 10, 30, 60$  and  $100$  nm are investigated by Kerr microscopy. MTJ's were prepared using DC magnetron sputtering and annealed in vacuum at  $300^\circ\text{C}$  for 1 hour under a magnetic field of  $80$  kA/m, followed by field cooling. The hysteresis loop measurements at different angles of external magnetic field (in relation to the unidirectional easy axis) were performed by R-VSM and MOKE magnetometers and have been compared to the field sequences of Kerr microscope domain images, in order to get an understanding of domain-related switching hysteresis of the free layer. The as deposited samples were characterized by oblique hysteresis loop, irregular, slowly switching domains superimposed by ripple structure (Fig. 1), while the annealed ones were characterized by rectangular hysteresis and fast switching, large domain (Fig. 2). The relation between domain structure, magnetization process and interlayer coupling have been discussed.

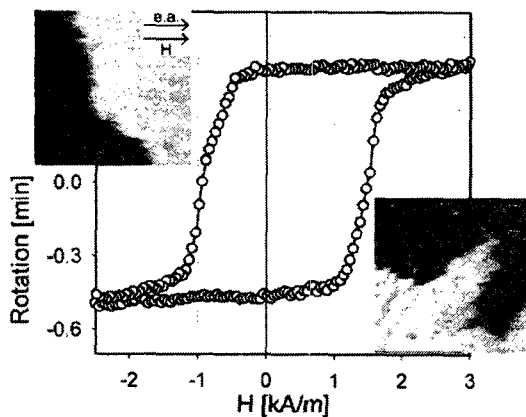


Fig. 1 Hysteresis loop and domain pattern for as deposited with  $t = 10$  nm.

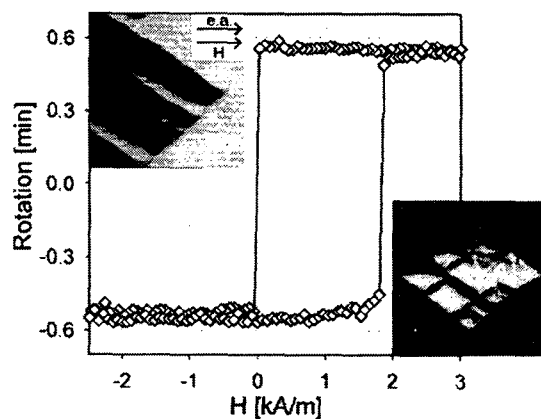


Fig. 2 Hysteresis loop and domain pattern for annealed MTJ with  $t = 10$  nm.