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A study of magnetic domain formation and motion in perpendicularly magnetized ultrathin film using the magnetic ac-susceptibility NIDAL ABU-LIBDEH, DAVID VENUS, McMaster University — The Complex, low-frequency ac magnetic susceptibility χ has been used to study magnetic domain formation and motion in perpendicularly magnetized ultrathin Fe films on a 2ML Ni/W(110) substrate. Analysis of the real and imaginary part of χ reveals that below a characteristic temperature T_{sat}, the stripe-domain density cannot change quickly enough to maintain equilibrium. This is due to the fact that domain wall creation and/or annihilation is itself an activated process, with nucleation energy E_n, distinct from the pinning of existing domain walls by defects in film structure, with activation energy E_a. T_{sat}, is set by the time scale of the measurements, which is determined by the rate of change of temperature (R). The Magnetic susceptibility was recorded as a function of temperature at different heating rates between 0.03 (K/s) to 1 (K/s). Our results show that below heating rate R_c(= 0.2 K/s for 1.5ML Fe film) the susceptibility peak temperature (T_{peak}) decreases as dT/dR = -200.0 (s). Above R_c, the susceptibility peak temperature increases as dT/dR = 16.6 (s). Preliminary model calculation show the movement of T_{peak} is due to the change in T_{sat} as the heating rate changes. $R_c$is set by the relative values of $E_n$and E_a.

Nidal Abu-Libdeh
McMaster University

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