

Evolution of magnetic stripe domain in the vertical magnetic field

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The evolution of magnetic stripe domain with different stripe width in perpendicular magnetic field was carefully investigated by spin-polarized low-energy electron microscopy. We found the stripe width with the magnetization opposite to the field first decreases with the field, then disappear one by one until form a single domain if the stripe width is less than 600nm, as shown in Fig.1. This result is significant different with a recent report (Sartz, PRL, 104, 077203 (2010)) in which the stripe domain first change into the bubble phase before being fully magnetized. Moreover, we found that the black domain at high field always keeps a constant width before it disappear, and a linear correlation between the width of stripe domain in zero fields and the width of the narrowest stripe domain in the fields could be found(as shown in Fig.2), indicating the minimum domain width is determined by the magnetic anisotropy. Such phenomenon can't be understood using the existing theoretic models, and we think the DMI may play an important role during the measurement.

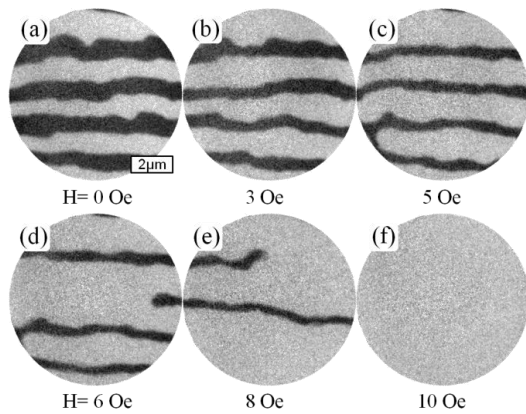


Fig.1: The evolution of the stripe domain in the perpendicular field.

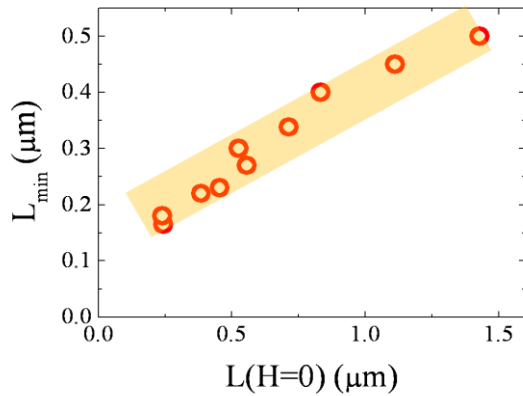


Fig.2: the relation between the minimum domain width and the initial domain width at zero field.