Perpendicular Magnetic Anisotropy Materials for Spintronics Applications

by Ho Pin

Date: 23rd October 2013 (Wednesday)
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Venue: E3-06-07

Abstract

Ferromagnetic materials with large perpendicular magnetic anisotropy (PMA) are investigated for spin transfer torque magnetic random access memory (STT-MRAM) elements, as they fulfill thermal stability at low dimensions and lower the critical current density for STT switching. \(L1_0\)-FePt is a potential candidate for such perpendicular systems due to its high magneto-anisotropy of \(7 \times 10^7\) erg/cm\(^3\). This thesis revolves around the study of high PMA \(L1_0\)-FePt in pseudo spin valves (PSVs). Different spacer materials, Ag and TiN, were used. The PSV with Ag spacer displayed an improved giant magnetoresistance of 1.1 % compared to the Au, Pt and Pd spacer reported earlier. The use of TiN spacer mitigated the interlayer diffusion issue as TiN was chemically stable towards FePt and was also a good diffusion barrier. The thesis also further demonstrated PSV structures consisting of an ultra-thin (\(\leq 4\) nm) \(L1_0\)-FePt free layer which is desirable for a reduction of the STT critical current density.

Speaker  Ho Pin

Biography

Ms. Ho Pin obtained her bachelor’s degree in Materials Science and Engineering from the National University of Singapore (NUS) in July 2009. She is currently a graduate student, working under the supervision of Prof. Chen Jingsheng in the Department of Materials Science and Engineering, NUS. Her research work focuses on the fabrication and investigation of FePt-based spintronics devices.

ALL ARE WELCOME!

Assoc Prof Daniel J. Blackwood Host