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Nano-granular FePt thin films for thermally-assisted magnetic recording TIFFANY SANTOS, OLEKSANDR MOSENDZ, SIMONE PISANA, JAMES REINER, GREGORY PARKER, BARRY STIPE, DIETER WELLER, Hitachi Global Storage Technologies — In order to extend the data storage density in hard disk drives beyond 1 Tb/in^2, nano-size grains of a high crystalline anisotropy (K_u) material are required to obtain these high densities and maintain thermal stability. A promising approach to recording using high-K_u materials is thermally-assisted magnetic recording (TAR), in which the media is locally heated above the Curie temperature while a magnetic field is applied in order to write a bit. FePt with $L1_0$ crystalline order is a potential candidate for TAR media. We deposit FePt nano-granular films with carbon as the segregant material, by co-sputtering on glass substrates at elevated temperature. Underlayer materials are selected for heat-sinking and to attain high out-of-plane $L1_0$ order. Characterization of the media by x-ray diffraction, magnetometry and transmission electron microscopy show that we can achieve properties that are promising for TAR media, such as an average grain size < 7.5nm, size distribution as low as 16%, coercivity as high as 5 tesla and $K_u > 4.5$ x 10^7 erg/cm^3. Recording densities exceeding 600 Gb/in^2 have been demonstrated for our FePt granular films using a static tester.

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