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Well-isolated FePt grains with high coercivity on TiN underlayers for heat-assisted magnetic recording media TIFFANY SANTOS, SHIKHA JAIN, AKEMI HIROTSUNE, OLAV HELLWIG, HGST — MgO is the underlayer material of choice for granular FePt thin film media for heat assisted magnetic recording, because MgO (001) seeds $L1_0$-ordered FePt with c-axis perpendicular to the film plane and high perpendicular magnetic anisotropy. MgO is also an effective diffusion barrier between the FePt grains and the metallic underlayers beneath the MgO. However, there are possible concerns associated with using MgO in the media structure. MgO is highly sensitive to moisture, and hydration of MgO could potentially degrade film properties. In addition, many particulates are incorporated into the film during the RF-sputter process, which can be sources of delamination, pinholes and damage to the low-flying recording heads. TiN is an attractive alternative to MgO because it is chemically and mechanically robust, and TiN can be DC-sputtered, which produces fewer particles and has a faster deposition rate. Even though TiN has the same rocksalt crystal structure and lattice constant as MgO, the higher surface energy of TiN causes more wetting of the FePt grains on the TiN surface. As a result, deposition of granular FePt on TiN most often produces interconnected, worm-like grains with low coercivity. We will show that by optimizing the deposition of FePt and segregant material on the TiN underlayer, we are able to fabricate FePt media with well-isolated grains and high coercivity reaching nearly 4 Tesla. In addition, the FePt has excellent structural properties with a high degree of $L1_0$ atomic ordering and minimal c-axis in-plane oriented grains.

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