Extended Abstract
Volume 9:1, 2021

Biodiversity and Endangered Species

Open Access

BIT PATTERNED MEDIA- PROBING MAGNETIC PROPERTY USING EHE MEASUREMENT

Sandeep Kumar Srivastava

Central Institute of Technology, India, E-mail:sk.srivastava@cit.ac.in

Abstract

There is a frantic race to escalate the storage density of hard disk drive (HDD) due to its vast applications. The recording media utilized for making conventional HDD is made up of varied layers thin film or magnetic alloys, which naturally forms nanometer-scale grains and every recorded bit is kept across hundreds of these magnetic grains. Although, the conventional perpendicular media is being used in present recording technology, but it is expected to drop its fuel in next few years due to a circumstances called super-paramagnetism (thermal stability of recorded bit). Newly, one alternative potential way has been proposed, so known as bit patterned media (BPM). Bit Patterned Media (BPM) for magnetic recording supply a way to densities $>1 Tb/in^2$ and circumvents numbers of the challenges connected with conventional granular media technology. Instead of recording a bit on an ensemble of random grains, BPM uses an arrangement of lithographically defined isolated magnetic islands, each of which kept one bit. Manufacture of BPM is viewed as the significant and big challenge for its commercialization. In this article we explained a BPM manufacture method which combines e-beam lithography, directed self-assembly of block copolymers, self-aligned double patterning, nanoimprint lithography, and ion milling to give rise to BPM based on CoCrPt alloys

In such bit patterned media, every artificially fabricated magnetic nanostructure can kept an individual bit rather than utilizing hundreds of naturally formed small grains to store single bit. Ordered arrays of isolated magnetic nanostructures are of appreciable interest to escalate the storage density of hard disks beyond the present perpendicular media. In such bit patterned media (BPM), every artificially fabricated magnetic nanostructure can store a particular bit.

We advanced a novel non-lithographic technique to fabricate perpendicularly magnetized BPM system and we observed Co/Pt bit pattern media.

In present talk, the author will check out few results on Co/Pt bit pattern media, as well as results on CoTb alloysbased bit patterned media. This amalgamation of fabrication technologies attains feature sizes of $<10 nm$, significantly smaller than what conventional semiconductor nanofabrication technique can achieve.

The advantages of rectangular bits are analyzed from a theoretical and modeling point of view, and system integration requirements such as servo patterns, implementation of write synchronization, and providing for a stable head-disk interface are addressed in the context of experimental results. Optimization of magnetic alloy materials for thermal stability, writeability, and switching field distribution is discussed, and a new method for growing BPM islands on a patterned template is presented.

These materials were manufactured using the barrier layer of auto-assembled anodic alumina template (a non-lithographic method) and by depositing either CoPt multilayers or CoTb alloy to shape an ordered array of ferromagnetic nanodots, so-called nanobumps. We used remarkable hall resistance quantification to probe magnetization reversal mechanism and switching field distribution. The role of interdot exchange coupling and dipolar coupling, magnetization reversal procedure will be discussed.

This work is partly presented at 2nd International Conference on MAGNETISM AND MAGNETIC MATERIALS September 24-26, 2018 | Budapest, Hungary