

課題番号 : F-15-TU-0051  
 利用形態 : 機器利用  
 利用課題名(日本語) :  
 Program Title (English) : Bit patterned recording media  
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### 1. 概要(Summary)

Recently various kinds of approaches have been pursued to develop magnetic recording media with areal densities  $\sim$  tera-bits/inch<sup>2</sup>. Bit patterned media (BPM) is promising for future magnetic storage. This implies the formation of an ordered two dimensional array of magnetic nano-structures with out-of-plane magnetic anisotropy. Several methods, such as lithography, self-assembly, ion implantation etc. were suggested to fabricate the patterned islands of high anisotropy magnetic materials (such as L10 FePt). However, these arrays cannot achieve practical applications unless a soft magnetic underlayer that improves the performance of bit-writing is applied. We found that the soft magnetic metallic glass thin films have ability to grow L10 FePt in preferred orientation, which is very difficult with conventional materials.

### 2. 実験(Experimental)

[利用した主な実験装置]

EB writing system

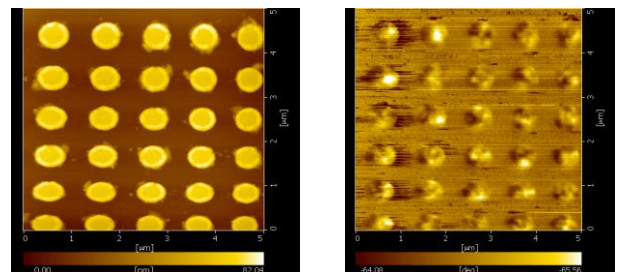
[実験方法]

Bit Patterns of diameter 400-500 nm were fabricated to test the patternability of L10 (111) FePt/FeHfNbYB bilayered structure by using Elionix ELS-G125S EB writing system and SAL.

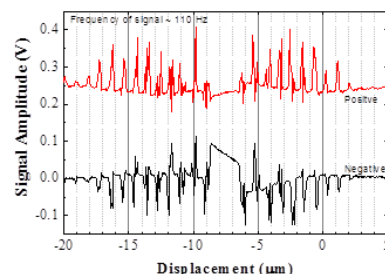
### 3. 結果と考察(Results and Discussion)

AFM and MFM study shows the topography and magnetic domain structure of the bit patterns. A multi-domain type of structure can be noticed inside each bit pattern and it is expected for this size. To confirm the reading/writing performance of

bit patterns of L10 (111) FePt/FeHfNbYB, static tester was used. The static tester consists of a conventional perpendicular magnetic head placed in contact with bit patterns. Figure 1(b) shows the read-back signal waveform taken from the 500 nm bit patterns for the DC current magnetized states.



(a)



(b)

Fig. 1 (a) AFM topographic image of the patterns (left) along with MFM image (right). Bits are in multi-domain state. (b) Waveform of magnetic recording/reading tests with a commercial perpendicular read/write head.

### 4. その他・特記事項(Others)

なし。

### 5. 論文・学会発表(Publication/Presentation)

なし。

### 6. 関連特許(Patent)

なし。