Abstract
Magnetic anisotropy graded media may enable the writability problem in ultrahigh density magnetic recording to be overcome. An important technical challenge is developing an ability to control the magnetic anisotropy of each magnetic layer. For FePt thin films, the anisotropy can be tuned by varying the chemical order parameter. By varying the growth temperature, epitaxial films of Fe_{100-x}Pt_{x} were prepared with order parameters ranging from 0 to 0.9 as determined by x-ray diffraction. By carefully controlling the flux of the magnetron sources, epitaxial films of Fe_{50}Pt_{50} with 33<x<50 were also produced. The magnetic properties were then determined using AGM.

Sample Structure

Structural Properties for Fe_{50}Pt_{50} Films

• As the deposition temperature increases, the intensity of (001) peak increases. This indicates a higher amount of ordering.

• As the temperature increases, the (002) peaks shifts to a higher angle. This indicates a decrease in the c lattice parameter.

Fe_{50}Pt_{50} films have the easy axis out-of-plane at T_{growth}>400°C.

• The disordered film (S=0) has an in-plane easy axis.

• With the increase of order parameter S, the saturation of hard axis loop becomes more and more difficult, which indicates the anisotropy increases with the order parameter.

Conclusions
• Epitaxial Fe_{100-x}Pt_{x} films show a dependence of anisotropy on order parameter.

• The change in the magnetic properties of FePt, with composition, cannot be adequately assessed and needs further study.

References

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Control of Magnetic Anisotropy in Epitaxial FePt (001) Films

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