

Chapter 5 Summary

1. For the media of Pt/Ru/CoPtCr-SiO₂, the magnetic grains of the finely-tuned CoPtCr-SiO₂ recording layer have good magnetic performance such as high perpendicular anisotropy, good segregation at grain boundaries and small grain size about 7-8nm. In particular, the perpendicular H_c could achieve 4200 Oe as well as the high SQ value about 0.8.
2. Furthermore, the insertion of Ta buffer-layer below the previous media described as Ta/Pt/Ru/CoPtCr-SiO₂ could even enhance the perpendicular H_c to 4500 Oe, almost unity SQ, and larger negative H_n to -2000 Oe. Moreover, the CoPtCr-SiO₂ media with Tb underlayer could both enhance the segregation and reduce grain size, which will narrow the c-axis distribution and enhance peak intensity effectively, as well as the superior magnetic properties.
3. Increasing working pressure of Ru seedlayer would drive the peak of c-axis (00.2) to a high angle, which is due to increasing in-plane tensile stress. However, anisotropy orientation and switching field distribution are both raised by this trend. The effects of Ru working pressure indeed influence the CoPtCr-SiO₂ media deeply on the magnetic and structural properties.
4. Full-stacked structure is combined the recording layer with soft underlayer and biasing layer as illustrated as Al-Mg substrate /Ta/NiFe₂₀/CoFe₉₀/IrMn/CoFeN/Ta/Pt/Ru/CoPtCr-SiO₂. Subsequently,

post-annealing process is used for full-stacked media, which is applied magnetic field about 1 kOe in order to fix the magnetization of soft underlayer/ biasing layer. Consequently, the magnetic performances are still greatly promoted.

5. Finally, the R/W test shows that our media could achieve high SNR value about 25.65 dB, which is in great acknowledgement of Showa-Denko HD Trace. Moreover, we can confirm that the recording density of our media is the best candidate to achieve 100 Gb/in² from the observation of MFM pattern, indicating that our media with the best structure is the most suitable for performing ultra-high recording density of perpendicular magnetic recording media.

