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Stress Evolution of $Co_{68}Cr_{18}Pt_{14}$ Thin Films on Diblock Copolymer Self-Assembled Surface

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Recent studies focus on artificially roughened surface, since it could be possible to provide a well-defined rough surface/interface as well as to obtain the desirable magnetic properties by artificially creating and controlling the surface structure and morphology[1-2]. In this study, we have investigated correlation of mechanical stress and growth structures of $Co_{68}Cr_{18}Pt_{14}$ thin films deposited on periodically modulated PS_{21400}(styrene)-PVP_{20700}(vinyl pyridine) diblock copolymer self-assembled surface.

Fig. 1 show the evolution of force/width curve in CoCrPt/Si and CoCrPt/PS-PVP/Si samples measured by in-situ stress measurement system. The positive and negative slope means a tensile stress and a compress stress in the film, respectively. It is worthwhile to mention that the magnitude and sign of stress observed in CoCrPt/Si and CoCrPt/PS-PVP/Si samples are completely different, i.e. the developed stress in CoCrPt/Si sample shows two time larger than CoCrPt/PS-PVP/Si sample in magnitude with a slope of different sign. Combined study of atomic force microscopy (AFM) and surface magneto-optical Kerr effect (SMOKE) revealed that the stress relaxation in the CoCrPt/PS-PVP/Si(100) is closely related with growth structure and magnetic properties of CoCrPt film on PS-PVP surface.

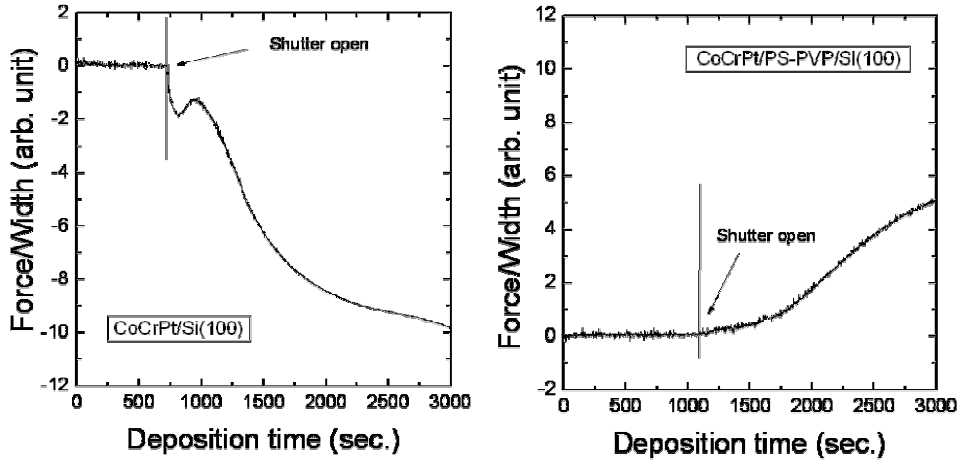

Fig. 1. Stress evolution of CoCrPt thin film on PS-PVP/Si(100) and CoCrPt/PS-PVP/Si(100) substrate.

References

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