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Transition from symmetric to a symmetric local coercivity distribution in CoCrPt alloy films

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CoCrPt alloy films are one of the most promising candidates for high-density perpendicular magnetic recording media due to their strong perpendicular magnetic anisotropy (PMA) and high coercivity[1]. In order to achieve high-density magnetic recording media, it is essential to characterize the local magnetic variation that relates to the microstructure of films. However, most of the previous studies on CoCrPt alloy films have been investigated only to investigate microstructural properties such as grain size and grain size distribution for further enhancement of recording performance. In this work, we have investigated the spatial distribution of the local coercivity on a submicrometer-scale in CoCrPt alloy films by simultaneous local measurements, where the local coercivity distribution takes crossover from symmetric to asymmetric distribution with increasing the Pt concentration. To understand the local coercivity distribution dependent on the Pt concentration, we have investigated the grain size distribution in CoCrPt alloy films via TEM images. And, we have performed the MonteCarlo simulation on grain growth using the lattice model described in Ref. 2 for clarify the variation of grain size distribution with the Pt concentration. It is found that the local coercivity distribution in CoCrPt alloy films is mainly governed by the grain size distribution. Monte Carlo simulation study reveals that the grain boundary energy dependent on the Pt concentration plays a crucial role in the grain growth of this system.

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