

Abstract

In this thesis we investigate the possibility of reducing the grain size of magnetic layer by doping impurity in the underlayer of magnetic recording media. Mn, Nb, Ag, Zr, Al were chosen as doping elements. Each element was added in the $\text{Cr}_{80}\text{Mo}_{20}$ underlayer by co-sputtering, and the grain size and texture variation were observed. In the samples of Mn-, Nb-, Ag-, and Zr-doped series, we found that a small doping proportion would enhance the texture of $\text{Cr}(200)$ and $\text{Co}(11\bar{2}0)$. The optimized doping proportions for best texture were 20% for Mn, 8% for Nb, 5% for Ag, and 2% for Zr. Although the grain size was reduced by doping, the coercivity all dropped perhaps due to fine grain size. Among the foregoing four series, Zr has the best performance, with which a light doping proportion of 5% can create an average grain size of 115 Å, 30% smaller than that of an undoped sample, and the coercivity still remains the same.