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Optical and magneto-optical properties of $MnPt_3$ films (abstract)

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Optically thick films of $MnPt_3$ were prepared by magnetron sputtering onto quartz substrates. Postdeposition annealing at 850 °C resulted in highly textured (111) films with the $L1_2$ (Cu_3Au) structure. $MnPt_3$ films are ferromagnetic with a Curie temperature of 380 °C, and they show large magneto-optical effects in the visible.[1,2] These films also show a high degree of long-range order. The diagonal components of the dielectric tensor were determined using variable angle spectroscopic ellipsometry measurements over the spectral range 1.2–2.4 eV. Magneto-optic Kerr rotation and ellipticity measurements were made at near normal incidence over the spectral range 1.4–3.6 eV to determine the off-diagonal components of the $MnPt_3$ dielectric tensor. First-principles electronic structure calculations were carried out for the ordered $MnPt_3$ structure, and from these the components of the dielectric tensor were calculated. We find excellent agreement between the measured and calculated diagonal components, but only fair agreement for the off-diagonal components. [S0021-8979(97)87008-9]

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[1] K. W. Wierman and R. D. Kirby, J. Magn. Magn. Mater. **154**, 12 (1996).
[2] T. Kato, pH. Kikusawa, S. Iwata, S. Tsunashima, and S. Uchiyama, J. Magn. Magn. Mater. **140-141**, 713 (1995).

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