

Epitaxial Growth of Pt Thin Film on Basal-Plane Sapphire Using RF Magnetron Sputtering

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Rare earth metal films have been used as a buffer layer for growing ferroelectric thin film or a seed layer for magnetic multilayer. But when it was deposited on semiconductor substrates for the application of magneto-optic (MO) storage media, it is difficult to exactly measure magnetic constants due to shunting current, and so it needs to grow metal films on insulator substrate to reduce such effect. Recently, it was reported that ultra-thin Pt layer were epitaxially grown on Al_2O_3 by ion beam sputtering in ultra high vacuum and it can be used as a seed layer for the growth of Co-contained magnetic multilayer.

In this study, Pt thin film were epitaxially grown on Al_2O_3 (0001) by RF magnetron sputtering. The crystalline structure was analyzed by transmission electron microscope (TEM) and Rutherford Back Scattering (RBS)/Ion Channeling. In TEM study, Pt was believed to be twinned on Al_2O_3 (0001) surface about Pt(111) plane. Moreover, RBS channeling spectra showed that minimum scattering yield of Pt(111)/ Al_2O_3 (0001) was 4% and Pt(111)/ Al_2O_3 (0001) had 3-fold symmetry.