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M-edge Resonant Magneto-Optical Kerr Effect on Artificial Superlattice Co/Pd Multilayers

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Artificial superlattices that are composed of alternative layers of magnetic and non-magnetic materials have been reported to show magnetic moment that is larger than the magnetic bulk crystal. The individual layers are as thin as several Å and the magnetic enhancement is due to their interface effect. It has been reported that the Co/Pd superlattice even shows the large magnetic moment along the perpendicular direction that can be used as an element in data storage media [1].

In the present research, we made measurements of the resonant magneto-optical Kerr effect (RMOKE) of the Co/Pd superlattice at the photon energy of the Co *M*-shell absorption edge. The RMOKE method has advantages of element-selectivity and of the much larger signal compared to the visible MOKE [2]. Moreover, the measurement takes the simple photon-in & photon-out set-up and, thus, it has also feasibility for ultrafast time-resolved experiments using a free electron laser [3].

Figure 1 shows (a) the Co/Pd sample structure and (b) the spectrum of the magneto-optical Kerr rotation angle near the Co *M*-shell absorption edge. The sample was prepared *ex situ* and capped with Ta/Ru layer to prevent the oxidization. The spectrum (b) was measured by the using rotating analyzer ellipsometry method. The angle was as large as 7 degree at the edge and the additional feature was also observed at the pre-edge that likely due to the quantum interference effect (the Fano effect).

References

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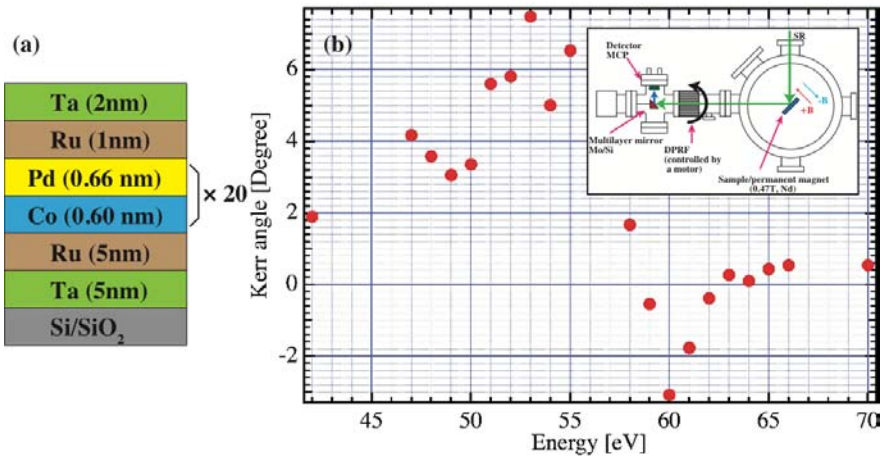

Figure 1 (a) The superlattice structure of the Co/Pd sample. (b) Kerr rotation spectrum near the Co *M*-shell absorption edge.