

Ferromagnetic Resonance in Ru/Co/MoPt multilayers

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Introduction

Synthetic antiferromagnets (SAFs) are based on the oscillatory RKKY interlayer exchange coupling of thin magnetic layers through metal, via the conduction electrons [1]. The low field tunability of the magnetic state in SAFs opened the route to spintronic devices [2]. It is the same tunability that makes them attractive for other applications such as tunable magnonics [3] and terahertz nano-oscillators [4]. In Ru/Co multilayers with in plane anisotropy we have observed hybridized modes of mixed optic-acoustic character. Here we extend the study to a perpendicular anisotropy system Ru/Co/MoPt.

Experimental Methods – Results

The multilayered $[\text{Ru}_6/\text{Co}_x/\text{MoPt}_4]_{12}$ (with $x=12-16$ Å) films have been deposited on rotating substrates, at room temperature by magnetron sputtering. The hysteresis loops show a weak perpendicular anisotropy with a smeared spin-flop transition about 5kOe. Angle dependent cavity FMR results support the conclusion that the samples exhibit a canted AF state up to 14kOe.

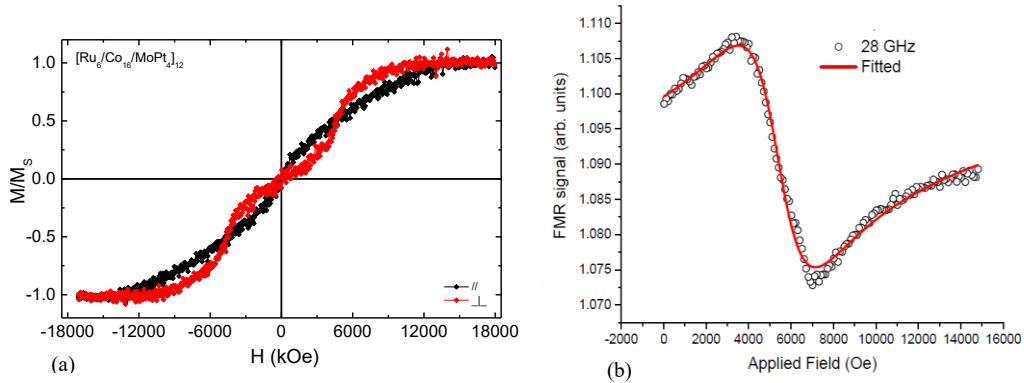


Figure 1: Typical (a) VSM magnetization curves and (b) FMR spectra for $[(\text{Ru}_6/\text{Co}_{16}/\text{MoPt}_4)_{12}]$ sample.

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References

- [1] P. Ntetsika, G. Mitrikas, G. Litsardakis, I. Panagiotopoulos, Mater. Adv., **10**, 1039 (2022).
- [2] A. Fert, Rev. Mod. Phys., **80**, 1517 (2008).
- [3] M. Ishibashi, Y. Shiota, T. Li, S. Funada, T. Moriyama, and T. Ono, Science Advances, **6**, 1-8 (2020).
- [4] T. Seki, H. Tomita, A. A. Tulapurkar, M. Shiraishi and T. Shinjo, Appl. Phys. Lett., **94**, 212505 (2009).

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