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Growth of high-quality nanometre-thick yittrium iron garnet by sputtering and their magnetic properties ARPITA MITRA, OSCAR CESPEDES, MANNAN ALI, B.J. HICKEY, Univ of Leeds, UNIVERSITY OF REGENSBURG COLLABORATION — Observation of Spin Seebeck effect(SSE) in magnetic insulators has led to dramatic advances in spin currents research and its applications for thermo-spintronics devices. Here we report deposition of high quality nm-thick yittrium iron garnet(YIG) film on gadolinium gallium garnet(GGG) by RF magnetron sputtering. The morphology and magnetic properties of the films were studied by using AFM and SQUID VSM respectively. 10-60 nm thick films have surface roughness of 1-3Å,and (111) orientation. Our results show that magnetic properties of YIG depend strongly on thickness: magnetic moment has linear dependence at room temperature. The saturation magnetization and coercive field observed in thick films are 136 emu/cc and 0.50 Oe, respectively. Temperature dependence of magnetization of nm-thick YIG films has revealed an interesting result,which can be attributed to an additional magnetic phase at the YIG/GGG interface. The reduction in magnetization at low temperatures up to now has not been reported, but has significant relevance to the spin hall magnetoresistance(SMR) at low temperature.Our results on the temperature dependence of Gilbert damping factor of YIG and YIG/Pt films will lead to new physics, to understand its effect on spin mixing conductance and SMR in magnetic insulators

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