

Substrate-dependent modifications of ultrathin cobalt films driven by femtosecond laser pulses

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Magnetic properties of ultrathin Co sandwiched between Pt or Pd films deposited on various substrates (Al_2O_3 , Si/SiO_2) were irreversibly modified by femtosecond laser pulses, similarly as in [J. Kisielewski *et al.*, J.Appl.Phys. **119**, 193901 (2016)]. Formation of out-of-plane magnetization phases is strongly dependent on the type of substrate. Dynamic pump-probe studies were carried out in the low pump pulse energy regime, where the light-heating process is reversible. A cooling rate of hundreds of picoseconds was also substrate-dependent, which can be related to its heat conductivity. The results are supported by calculations of temperature dynamics during the pulse irradiation. Irreversible laser-induced modifications can be used to pattern out-of-plane magnetic structures, which we demonstrate with interference lithography.

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