NMR Spin-Lattice Relaxation Time $T_1$ of Thin Films Obtained by Magnetic Resonance Force Microscopy

SUNGMIN KWON, SEUNG-BO SAUN, SOONCHIL LEE, KAIST, SOONHO WON, Advanced Metallic Materials Division, Korea Institute of Materials Science — NMR spectrum and spin-lattice relaxation time ($T_1$) of CaF$_2$ thin film samples deposited on a silicon cantilever tip were obtained by magnetic resonance force microscopy (MRFM). Thickness of the thin films were 50nm and 150nm. In order to measure $T_1$, a cyclic adiabatic inversion method was used with periodic phase inversion. A comparison of the bulk and two thin films showed that $T_1$ becomes shorter as the film thickness decreases. To make the comparison as accurate as possible, all three samples were loaded onto different beams of a multi-cantilever array and measured in the same experimental conditions such as temperature and magnetic field.

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