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Study of MgB_2 Films for RF Cavity Applications[1] TENG TAN, CHENGGANG ZHUANG[2], ALEX KRICK, KE CHEN, XIAOXING XI, Department of Physics, Temple University — Magnesium diboride (MgB_2) is a promising superconducting material for RF cavity applications due to its high critical temperature T_c and large thermodynamic critical field H_c. Using Hybrid Physical-Chemical Vapor Deposition (HPCVD), we have grown 2"-diameter MgB_2 films on sapphire and metal substrates, including molybdenum, niobium, tantalum, and stainless steel. Measured by DC magnetization, the T_c's of these films were between 38.2 to 39.2 K; the upper critical field H_{c2}'s were about 7 T, in consistent with previously reported value of clean MgB_2 films; the zero-field critical current density J_c's were above 10^7 A/cm^2 and were suppressed rapidly by increasing applied magnetic field, indicating a lack of pinning in clean MgB_2 films. Multilayered MgB_2/MgO films were also investigated to prevent vortex penetrating the MgB_2 layer and increase the vortex penetration field (H_{c1}) following Gurevich's theoretical work [1]. The RF properties of these films were studied.

[1] A. Gurevich, *Appl. Phys. Lett.* 88, 012511 (2006).

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