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Hybrid Physical-Chemical Vapor Deposition of MgB_2 Film on Flexible Dielectric and Metallic Substrates ERIC MAERTZ, A. V. POGREBNYAKOV, J. M. REDWING, X. X. XI, The Pennsylvania State University — The need for flexible dielectric and metallic substrates arises when considering making wires or tapes for high field applications. To accomplish this, Cu wire and foil with a buffer layer, flexible yttrium stabilized zirconium (YSZ), as well as Nb, Ta, and stainless steel foil were used as substrates for polycrystalline MgB_2 film growth. The foil substrates used range from 1 to 3 mil thickness. The buffer layers deposited on Cu were Ni plating (on 28 BSG wire) as well as TiB_2 and Nb deposited by sputtering. These served as a barrier to prevent the chemical reaction between Cu and Mg that occurs during deposition of MbB_2. The resistance vs. temperature (R-T) dependences were recorded for the films successfully grown on these substrates. For the films on YSZ, R-T was recorded initially and then after bending of the film on the substrate over a diameter of 20mm. The T_C of MgB_2 on stainless steel was 38K; on YSZ and Nb it was 38.5K. This is lower than epitaxial films on SiC substrate with T_c up to 41.5K. The R-T curve for MgB_2 on YSZ remained almost completely unchanged after bending. These films hold promise for electromagnetic field generation applications. This work is supported by NSF and ONR.

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