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Properties of MgB_2 Thin Films Grown at Different Temperatures by Hybrid Physical-Chemical Vapor Deposition[1] MENNO VELDHORST[2], KE CHEN, Department of Physics, The Pennsylvania State University, University Park, Pennsylvania, USA, CHE-HUI LEE, Department of Materials Science and Engineering, The Pennsylvania State University, University Park, Pennsylvania, USA, QI LI, XIAOXING XI[3], Department of Physics, The Pennsylvania State University, University Park, Pennsylvania, USA — MgB_2 films grown by Hybrid Physical-Chemical Vapor Deposition (HPCVD) at high temperature excel in T_c, cleanness, and crystallinity. MgB_2 films have been grown at temperatures from 350°C to 750°C by a HPCVD system with separate Mg and substrate heaters. The 100 nm MgB_2 film grown on a (001) SiC substrate at 350°C has a T_{c0} of about 36K and a residual resistance ratio of about 1.4. X-ray diffraction and atomic force microscopy show that the film is polycrystalline. The low-temperature grown MgB_2 films are promising as the top electrode for sandwich-type all-MgB_2 junctions to preserve the integrity of the barrier layer.

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[3]Also with Department of Materials Science and Engineering, The Pennsylvania State University, University Park, Pennsylvania, USA

Xiaoxing Xi
The Pennsylvania State University

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