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Carbon Doped MgB2 Thin Films using TMB R.H.T. WILKE, QI LI, Department of Physics, Pennsylvania State University, X.X. XI, Department of Physics, Department of Materials Science and Engineering, Pennsylvania State University, D.R. LAMBORN, Department of Chemical Engineering, Pennsylvania State University, J. REDWING, Department of Materials Science, Pennsylvania State University — The most effective method to enhance the upper critical field in MgB2 is through carbon doping. In the case of thin films, "alloying" with carbon has resulted in enhanced Hc2 values estimated to be as high as 70 T for H parallel to ab and 40 T for H perpendicular ab [1]. "Alloying" refers to the in-situ Hybrid Physical-Chemical Vapor Deposition (HPCVD) of carbon containing MgB2 films using (C5H5)2Mg as the carbon source. While these films exhibit enhanced Hc2 values, there are amorphous boron- carbon phases in the grain boundaries that reduce the cross section area for superconducting current. We present here the results of our attempts to make more homogeneously carbon doped thin films using gaseuous trimethyl-boron (TMB) as the carbon source. Initial results indicate different behavior upon carbon doping using TMB from carbon-alloying. The microstructures and upper critical fields of the carbon doped films using TMB and carbon alloyed films will be compared. [1] V. Braccini et al., Phys. Rev. B 71 (2005) 012504. [2] A.V. Pogrebnyakov et al., Appl. Phys. Lett 85 (2004) 2017.

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