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The Introduction of substitutional and non-substitutional dopants into MgB2 in high pressure/Temperature or non-equilibrium regimes[1] MIKE SUMPTION, The Ohio State University — In an attempt to study the effect of doping of MgB2 under conditions leading to efficient doping, we used both an high temperature/high pressure induction furnace to dope into MgB2 bulks at temperatures up to 1600 C and 1500 Psi, and thin film, PLD multilayer and mixed layer film fabrication. The high temperature/high pressure formation was used to explore the solubility at high temperatures of various dopants, and the thin film formation was an attempt to use non-equilibrium conditions to inject dopants more effectively. The dopants used were C, Ti, and Zr. C was seen to reach a maximal level at 4 at% C site substituted into MgB2, as evidenced by EPMA and XRD results. Zr, of interest as a possible Mg site substitution in MgB2 was not seen to enter into the MgB2 phase (instead segregating) in the bulk high temperature/high pressure experiments, but was seen to enter in during PLD, as evidenced by STEM and XRD results. Ti additions were attempted in the high pressures and temperature rig, with some evidence for dopant introduction. Critical field measurements on the Zr doped samples where seen to suppress Bc2 for all except very low levels of Ti addition, presumably associated with the much greater doping efficiency.

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