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The Effect of Argon Ambient Pressure and Annealing Time on Bulk MgB_2 Superconductor[1] MURAT ERDEM, Abant Izzet Baysal University, OZGUR OZTURK, ELIF ASIKUZUN, SEYDANUR KAYA, Kastamonu University, SERAP SAFRAN, AHMET KILIC, Ankara University, CABIR TERZIOGLU, Abant Izzet Baysal University — The effects of Ar ambient pressure (vacuum, 0B, 10B and 20B) and annealing times (0.5 h and 1 h) on microstructural, superconducting and mechanical properties of bulk superconducting MgB_2 are investigated. The samples are produced using the solid state reaction method. X-ray diffraction (XRD) and scanning electron microscopy (SEM) measurements were performed for determination of the crystal structure, and surface morphology of MgB_2 samples, respectively. The superconducting properties were studied by AC magnetic susceptibility and DC resistivity measurements. Increasing the Ar pressure decreased the lattice parameters and hence the average grain size. Increasing the annealing time results in larger lattice parameters and larger grain formation. The susceptibility measurements revealed two step transition which is reminiscent of granular superconductors. The intra-grain transition temperature is determined to be 38.4 K for all samples. The inter-grain transition temperatures of 37.2 K is obtained for samples produced under Ar ambient. The samples produced under Ar ambient have better superconducting properties than the ones produced in vacuum. Increasing the annealing time under vacuum further decreases the superconducting properties probably due to Mg loss.

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Murat Erdem
Abant Izzet Baysal University

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