

Abstract Submitted
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Normal and superconducting properties of Co-doped BaFe₂As₂ and MgB₂ thin films after He ion irradiation LEILA KASAEI, MUSTAFA DEMIR, NERENDRA ACHARYA, Department of Physics, Temple University, Philadelphia, PA,USA, PUSKAR BHATTARAI, Department of Physics, Temple University, Philadelphia, PA, USA, VIACHESLAV MANICHEV, Department of Physics and Astronomy, Rutgers University, Piscataway NJ, YESUSA COLLANTES, ERIC HELLSTROM, Applied Superconductivity Center, Florida State University, Tallahassee, FL, USA, TORGNY GUSTAFSSON, LEONARD C FELDMAN, Department of Physics and Astronomy, Rutgers University, Piscataway NJ, XIAOXING XI, BRUCE. A. DAVIDSON, Department of Physics, Temple University, Philadelphia, PA,USA — We have investigated the normal and superconducting properties of Co-doped BaFe₂As₂ (Ba122) and MgB₂ bridges irradiated at room temperature using a 30 kV He⁺ beam (ZEISS Orion Plus Helium ion microscope) and doses between 10¹³–10¹⁷/cm². Our results show that the critical temperature of irradiated region reduces to <2K for doses >3x10¹⁴/cm² for Ba122 and ~1x10¹⁶/cm² for MgB₂ films. All the samples show a consistent increase in the resistivity of irradiated region with the increase in the beam dose. Furthermore, irradiated Ba122 becomes insulating at high enough dose (6x10¹⁶/cm²) while MgB₂ remains metallic at all doses used. This result for Ba122 allows us to fabricate planar SIS Josephson junction in this material; RSJ-like behavior and typical critical voltages I_cR_n of 400 V are seen at 10 K.

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