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**Effect of oxygen alloying on scattering processes in MgB<sub>2</sub>** RAGHURAM GANDIKOTA, RAKESH SINGH, YI SHEN, NATHAN NEWMAN, JOHN ROWELL, Arizona State University, ARIZONA STATE UNIVERSITY TEAM — The effect of oxygen alloying on  $T_c$ , resistivity,  $H_{c2}$ , and  $J_c$  of MBE-grown MgB<sub>2</sub> films was studied. Oxygen was introduced either during growth or by ex-situ heating in oxygen atmosphere. While the concentration of oxygen increased from 1 to 9%,  $dH_{c2}^{\parallel}(0)/dT$  of the films, at  $T_c$ , increases from 0.67T/K to 1T/K.  $J_c$ s greater than 400 kA/cm<sup>2</sup> (at 8T, 4.2K) have been observed in these films and increased oxygen alloying changes  $J_c$  very little.  $H_{c2}^{\parallel}(0)$  and  $H_{c2}^{-}(0)$  values, obtained in these films with  $T_{cs} \sim 31$ K, are as high as 43T and 32T respectively. These values are significantly higher than the maximum  $H_{c2}^{\parallel}(0)$  value obtained for ion irradiated films, neutron irradiated MgB<sub>2</sub> bulk, and C-alloyed MgB<sub>2</sub> bulk. While the  $J_c$  values of the oxygen alloyed films are higher than the C-alloyed Penn State films, the  $H_{c2}(0)$  values are, however, still significantly smaller than the record values found in the C-alloyed films.

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