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Evidence of new pinning centers in irradiated MgB_2 C. TARANTINI, A. MARTINELLI, P. MANFRINETTI, A. PALENZONA, I. PALLECCHI, M. PUTTI, C. FERDEGHINI, CNR-INFM-LAMIA, University of Genova, Via Dodecaneso 33, 16146 Genova, Italy, M.R. CIMBERLE, CNR-IMEM, Via Dodecaneso 33, 16146 Genova, Italy — It has been shown that C or SiC addictions can strongly enhance upper critical field of MgB_2, leading to an in-field increase of critical current, but without introducing pinning centers other than grain boundaries. On the contrary neutron irradiation introduces new pinning centers, as highlighted by a significant shift of the maximum of pinning force and by a strong improvement of J_c at high field. This effect can be correlated to the defects that neutron irradiation produces. In fact TEM images show the presence of nanometric amorphous regions whose sizes are compatible with the coherence length and such as to act as pinning centers through two different mechanisms. The influence that neutron irradiation induces on MgB_2 is also confirmed by magnetization decays that, differently by doped samples, show an important enhancement of pinning energies at high field. These measurements highlight as the increase of pinning energy with irradiation fluence is strongly correlated with J_c improvement.

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