

Abstract Submitted
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Barrier evolution of magnetic tunnel junction by annealing and under biased condition YUZI LIU, AMANDA K. PETFORD-LONG, Materials Science Division, Argonne National Laboratory — Energy-filtered transmission electron microscopy (EFTEM) and in-situ electron holography were applied to study changes to the tunnel barrier behavior of CoFe/MgO_x/CoFe magnetic tunnel junctions (MTJs) as a function of annealing and applied electrical bias. During annealing oxygen moved to the MgO_x to form a more stoichiometric and homogenous crystalline tunnel barrier, and Co diffused into the barrier. There is no significant change in Fe distribution. Annealing also results in a reduction of the barrier height. The effect of varying the bias voltage from -1.5 V–1.5 V is to change barrier asymmetry and to decrease the effective barrier width. These changes are a result of charge accumulation at the interface. Argonne National Laboratory is operated under Contract No. DE-AC02-06CH11357 by U.S. DOE. The electron microscopy was accomplished in the Argonne National Laboratory Electron Microscopy Center for Materials Research.

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