

Abstract Submitted  
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**High temperature annealing induced superparamagnetism in CoFeB/MgO/CoFeB tunneling junctions**<sup>1</sup> XIAOMING KOU, Department of Physics and Astronomy, University of Delaware, WEIGANG WANG, Department of Physics and Astronomy, Johns Hopkins University, XIN FAN, LUBNA SHAH, RAE TAO, JOHN XIAO, Department of Physics and Astronomy, University of Delaware, DEPARTMENT OF PHYSICS AND ASTRONOMY, UNIVERSITY OF DELAWARE TEAM, DEPARTMENT OF PHYSICS AND ASTRONOMY, JOHNS HOPKINS UNIVERSITY COLLABORATION — We have investigated the evolution of the magnetic transport properties as a function of short annealing time in CoFeB/MgO/CoFeB based MTJ junctions with a free layer of 2 nm. It is found that the hysteresis behaviors in MR loops disappear in samples annealed for 17 minutes. The linear region between MR and the applied field gradually increases. The MR loops without hysteresis can be well fitted by using the superparamagnetism theory, suggesting the formation of superparamagnetic particles in the free layer during the high temperature annealing. The control of MTJ properties with annealing time is desirable in magnetic field sensor productions.

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