Abstract Submitted
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In-situ Structure and Transport Correlations in Magnetic Tunnel Junctions[1] ANN CHIARAMONTI, AMANDA PETFORD-LONG, BERND KABIUS, JON HILLER, Argonne National Laboratory, Materials Science Division, WILLIAM EGELHOFF, NIST, MARK SCHEEFF, Hummingbird Scientific — The final transport properties of magnetic tunnel junctions are dictated by their underlying magnetic domain and microstructure. As such, atomic-level characterizations combined with local, site-specific transport measurements are essential to truly understand their fundamental behavior. In this poster, we present local, nanoscale, site-specific transport measurements of magnetic tunnel junctions with MgO and Al_2O_3 tunnel barriers and FeCo-based ferromagnetic layers made using a novel *in-situ* TEM nanobiasing holder. When combined with the simultaneous nanoscale microstructure and interfacial characterization available in the TEM, tunneling measurements from a fully described nanoscale region of the specimen can be obtained. The resulting I-V curves can be fit to the Simmons model [J.G. Simmons, J. App. Phys. **34**, 6 (1963)], allowing structure-transport relationships to be directly studied for a variety of tunnel junction materials and compositions.

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