Abstract

Magnetic tunneling junctions exhibiting a high resistance change with switching of the magnetization of their electrodes have a high application potential for magnetic random access memories (MRAM) and magnetic field sensors. In this work magnetic tunneling junctions with high tunneling magneto resistance (TMR) values have been fabricated. In contrast to other works the Al_2O_3 tunneling barriers in these samples were created with a UV-light enhanced thermal oxidation process which allows for barrier resistances ($R \cdot A$) lying in the range between natural oxidation and conventional plasma oxidation.

To determine barrier and electrode-barrier interface properties the magnetic tunneling junctions were subjected to extended transport characterizations. Structural properties of the layer stack and the barrier were investigated by the use of scanning tunneling microscopy (STM) and transmission electron microscopy (TEM) measurements.