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Properties of RF plasma treated magnetic tunnel junctions using an anodic oxidation spectroscopy

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Exchange biased spin-dependent tunnel junctions have been characterized, formed by structures of Ta/Co/AlO_x/NiFe with a Ta top electrode. Tunneling barriers were prepared by both of natural and plasma oxidation methods on 10-12Å Al layer for comparison. Several junction areas were patterned by narrow shadow masks and photolithography with a wet etching process. Effect of morphology variation of a base electrode on the TMR ratio was investigated, depending on sputtering conditions and RF plasma surface treatments. In addition, an anodic oxidation spectroscopy was performed to observe interfaces properties between tunneling barrier and magnetic electrodes. Typically, the junction exhibited more sharp interfaces with RF plasma treatment and post annealing around 250°C. The MR ratio increased from 12% to 20% with better morphology of base electrode.