

[첨진공기술과학자상 후보 2 : 반도체 박막 분과]

Enhanced thermal stability of magnetictunnel junctions formed by in-situ radiation annealing process on AlOx insulating barriers

윤갑수, 구자현, 도영호, 최원준, 김채욱, 홍진표
신기능 스핀소자 연구실, 한양대학교 물리학과

A new *in-situ* direct radiation annealing (IDRA) technique for AlOx insulating barrier was efficiently carried out to enhance thermal stability of exchange-biased magnetic tunneling junctions (MTJs) inside the chamber. This IDRA process was found to improve the dielectric and structural properties of AlOx insulating barrier in MTJs by the reconstruction of Al₂O₃ insulating barrier. An additionally conventional *ex-situ* annealing process also enhanced thermal stability of MTJs after the IDRA process by the significant reduction of inter-diffusion process between CoFe ferromagnetic layer and AlOx insulating barriers. Optimized magnetoresistance ratio of MTJs formed by in-situ radiation annealing process on insulating barrier was observed about 40% at room temperature. In addition, experimentally observed magnetoresistance ratios of MTJs with the IDRA process were preserved about 35 % up to 450 oC, correlated with the improved structural information of the insulating barrier.