

Recent progress in large tunnel magnetoresistance junctions

T. Miyazaki¹⁾, Y. Sakuraba²⁾, S. Tsunegi³⁾, M. Oogane³⁾ and Y. Ando³⁾

1 WPI Advanced Institute for Materials Research Tohoku University, 980-8579 Japan

2 Institute for Materials Research Tohoku University, 980-8577 Japan

3 Department of Applied Physics Tohoku University, 980-8579 Japan

Recently, much attention has been paid for the magnetic tunnel junctions (MTJs) with MgO barrier/CoFeB electrodes and /or Heusler electrodes which exhibit extremely large tunnel magnetoresistance (TMR) ratio. This is because these MTJs are expected as spintronics devices such as Spin-RAM or high sensitive sensors and/or high frequency devices. First, we will review shortly the recent progress of TMR ratio in MgO barrier MTJs reported by various groups. Then, we will explain in detail our recent research on tunnel magnetoresistance effect for MTJs with Heusler electrode. The main topics are ① relationship between degree of order and TMR ratio[1], ② temperature and bias dependences of TMR ratio[2] and ③ Gilbert damping constant α for various magnetic alloy films including Heusler alloys[3,4]. Finally, we will briefly explain the current-induced magnetization switching for various MTJs.

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