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Magnetic tunnel junctions designed for highly-sensitive magnetic sensor applications**Takafumi Nakano***Tohoku University, Japan*

A magnetic tunnel junction (MTJ) based on a CoFeB/MgO/CoFeB trilayer structure exhibit a giant tunnel magnetoresistance (TMR) effect. In addition, the CoFeB/MgO/CoFeB-based MTJ can be grown on a Si wafer and can be combined into a multilayered structure with various materials. These advantages drive us to apply the CoFeB/MgO/CoFeB-MTJ to a variety of magnetic sensor (hereafter called TMR sensor). The TMR sensor can be used at room temperature, can be microfabricated into a nanometer-scale, and can be driven with a small power consumption. Very recently, its magnetic field detectivity has reached a sub-pT level which enables us to detect a human bio-magnetic fields [1]–[4]. We believe that the TMR sensor showing these outstanding characteristics will be an essential device to construct a next-generation smart society. In this talk, we will introduce our recent works on the development of MTJs with a multilayered structure designed especially for the TMR sensor applications.

Biography

Takafumi Nakano received his Ph.D. degree at the Department of Applied Physics, Tohoku University in 2017. Since 2020, he has been an assistant professor at the Department of Applied Physics, Tohoku University. His research interest includes the development of multilayered structures for spintronic devices by a sputtering technique.