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JST owned patent wins Future Creative Invention Prize at the National Invention Award 2021

Intellectual Property Utilization Support Program
https://www.jst.go.jp/chizai/en/

The technology invented by Dr. Shinji Yuasa, Director of Research Center for Emerging Computing Technologies, National Institute of Advanced Industrial Science and Technology (AIST), has been awarded Future Creative Invention Prize at the National Commendation for Invention 2021 from the Japan Institute of Invention and Innovation for “invention of textured MgO-based magnetic tunnel junctions for advanced magnetic recording and memory” (patent no. 5120680). The invention is a research outcome of “Nanostructure and Material Property” of PRESTO program, and JST and AIST are co-owners of its patent.

This invention has enabled mass production of magnetic tunnel junctions (MTJs) using giant tunnel magnetoresistance (TMR) effect leading to the evolution of magnetic recording. MgO-based MTJs are currently applied to read heads of most of the hard disk drives (HDD), and realizing large-capacity HDDs contributes to the advancement of the information society. MgO-based MTJs has already been put into practical use as a nonvolatile memory, spin-transfer-torque MRAM (STT-MRAM) that does not lose its stored information even when the power is turned off, contributing to power saving and performance enhancement of smartphones and PCs.

【Future Creative Invention Prize: Inventor】
Yuasa Shinji, Director of Research Center for Emerging Computing Technologies, National Institute of Advanced Industrial Science and Technology

【Future Creative Invention Contribution Prize: Patent holding organization and its representative】
Ishimura Kazuhiko, President and CEO of AIST
Hamaguchi Michinari, President of JST

IP Bridge Exhibit 2027
Western Digital v. IP Bridge
IPR2025-00701

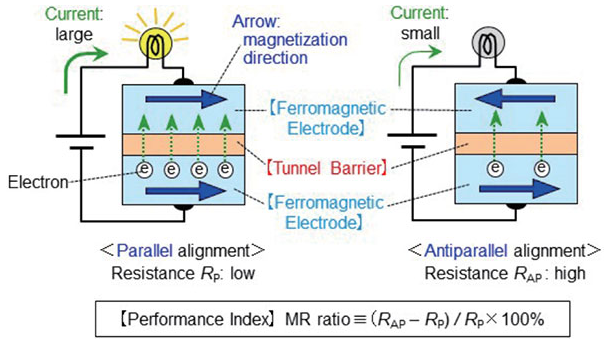

Figure 1: Schematic illustration of tunnel magnetoresistance (TMR) effect in magnetic tunnel junction (MTJ).

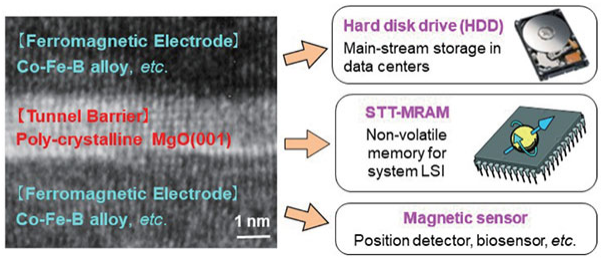

Figure 2: MgO-based MTJ of present invention and its industrial applications.

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