

Spin-torque diode effect in magnetic tunnel junctions

Rectification function has been observed in a CoFeB/MgO/CoFeB magnetic tunnel junction (MTJ), which shows the giant tunneling magneto-resistance effect. The junction size was about 100nm x 200nm. Applied radio frequency (RF) current exerts a spin-torque interaction on magnetization in the MTJ, and causes resonant precession of spins. The MTJ shows high resistance only for one direction of the applied RF current and yields dc voltage as a result. The output voltage would be larger than those of semiconductor diodes if critical voltage to switch magnetization is smaller than 25mV. We named this device a "spin-torque diode". New applications of spin-tronics devices such as high frequency devices, are expected.

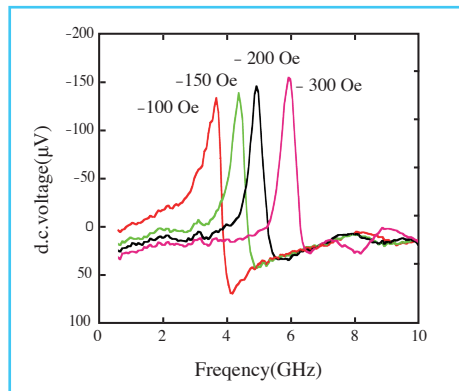


Figure : Spin-torque diode effect measured at room temperature. A very small CoFeB/MgO/CoFeB magnetic tunnel junction (100nm x 200nm) rectify RF current. Rectified dc voltage is large for a resonance frequency of a magnetic layer in the device. The resonance frequency is larger for larger external field. Given RF power is -15dbm.

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Genomics of *Aspergillus oryzae* and its application to industries

The *A. oryzae* genomics is expected to make a large contribution to traditional fermentation industries in Japan

The genome sequencing of *Aspergillus oryzae*, a filamentous fungus widely used in Japanese fermentation industries, has been completed by a Japanese research group. The *A. oryzae* genome consists of c.a. 37 Mb nucleotides and about 12,000 predicted genes. The genome sequence revealed that *A. oryzae* has redundant secretory hydrolases and that specific genes of *A. oryzae* are enriched in the blocks without synteny to other *Aspergilli*. Establishment of genomic research basis of *A. oryzae* has facilitated functional analysis and the research for industrial applications of the *A. oryzae* genes.

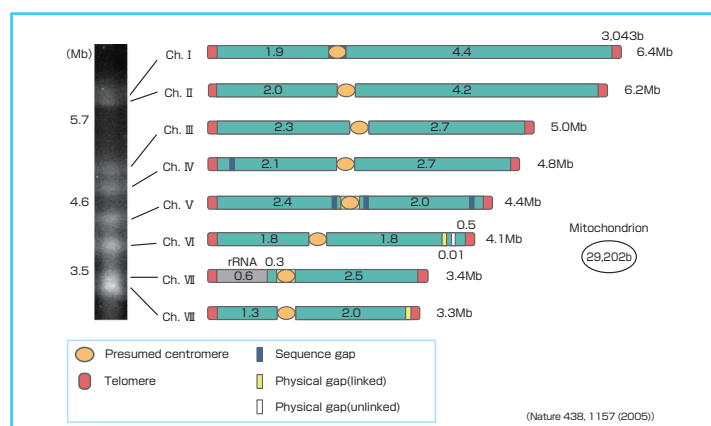


Figure : Analytical results for each chromosome

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