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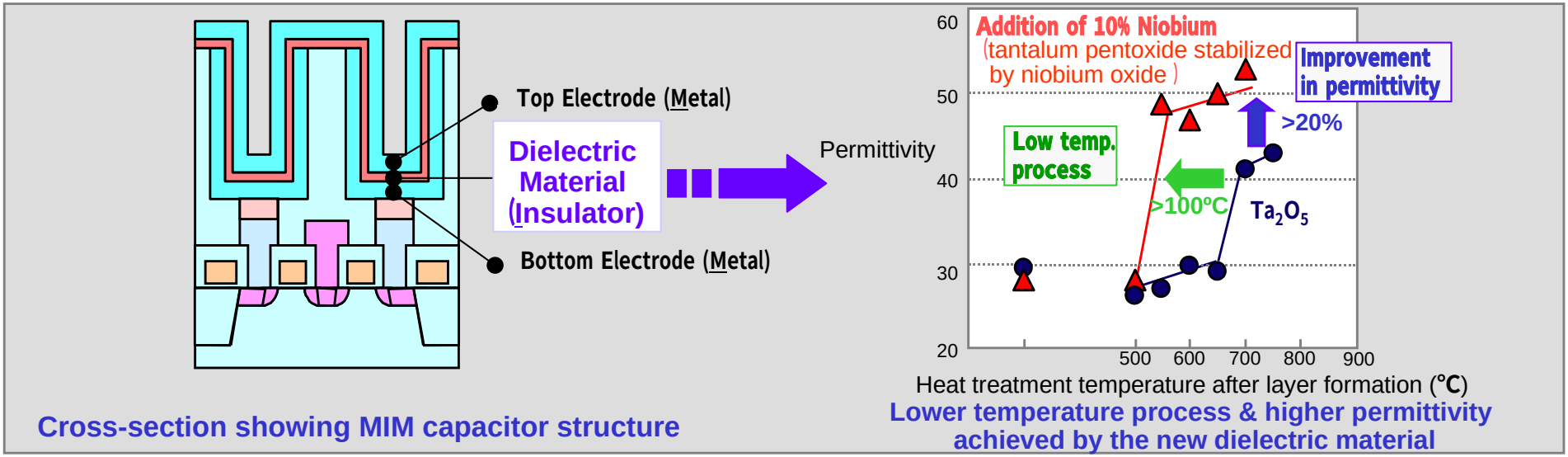
Development of novel MIM capacitor material for gigabit-generation DRAM

- Addition of niobium to tantalum pentoxide to achieve low temperature process & high permittivity -



Cross-section showing MIM capacitor structure

Lower temperature process & higher permittivity achieved by the new dielectric material

Hitachi, Ltd. and Elpida Memory, Inc. have developed a dielectric material for MIM(*1) capacitors for gigabit-generation DRAM.(*2) Lower crystallization temperature and higher permittivity were achieved by adding niobium to tantalum pentoxide, which is already being used in production. The problem of capacitor characteristic degradation, previously encountered during MIM capacitor fabrication and caused by oxidation of the bottom electrode, can now be controlled, and high quality MIM capacitors fabricated. The technology developed is highly compatible with previous dielectric fabrication technology, and is expected to become core technology in gigabit-generation DRAM.

((*1)MIM: Metal-Insulator-Metal; (*2)DRAM: Dynamic Random Access Memory))

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