



TaOx ReRAM

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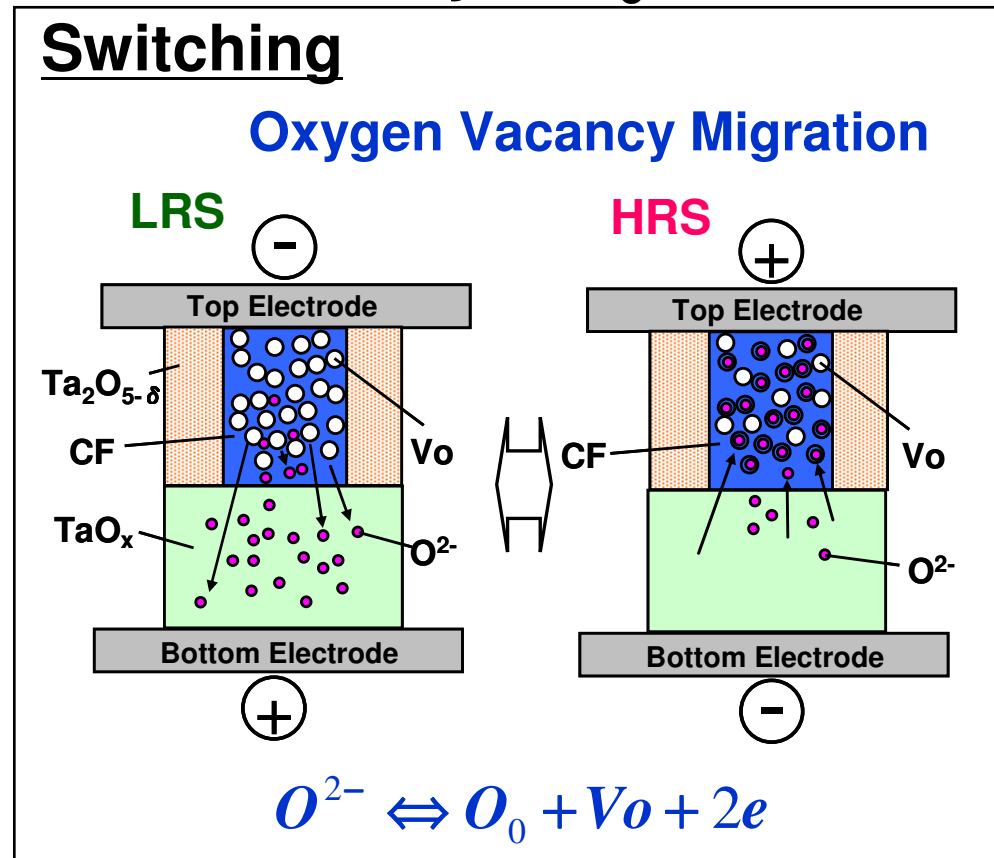
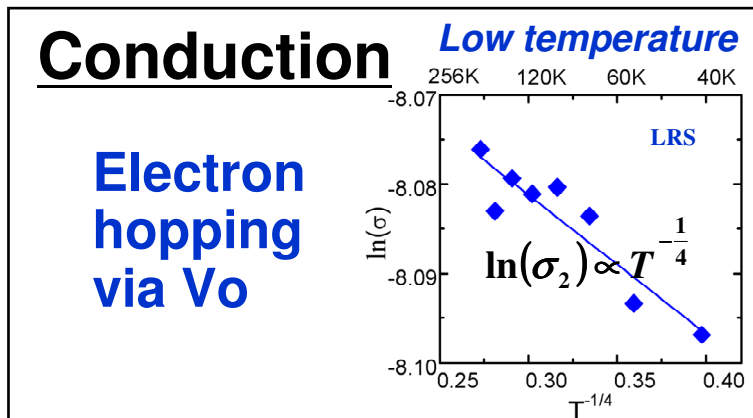
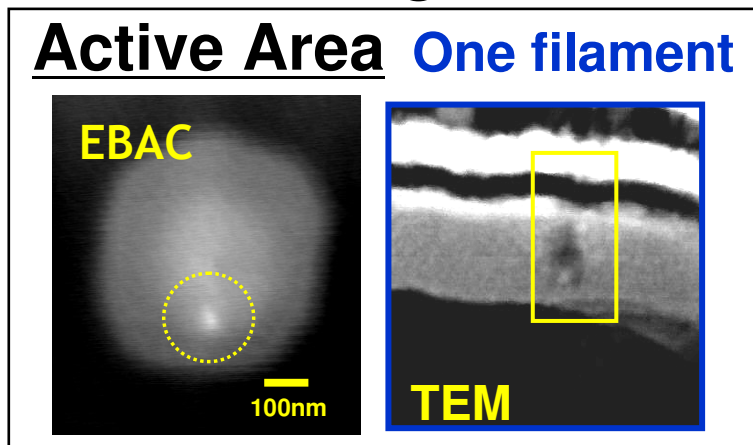


ReRAM

- Mechanism is still unclear
- Any oxide is switchable
- Emerging Memory

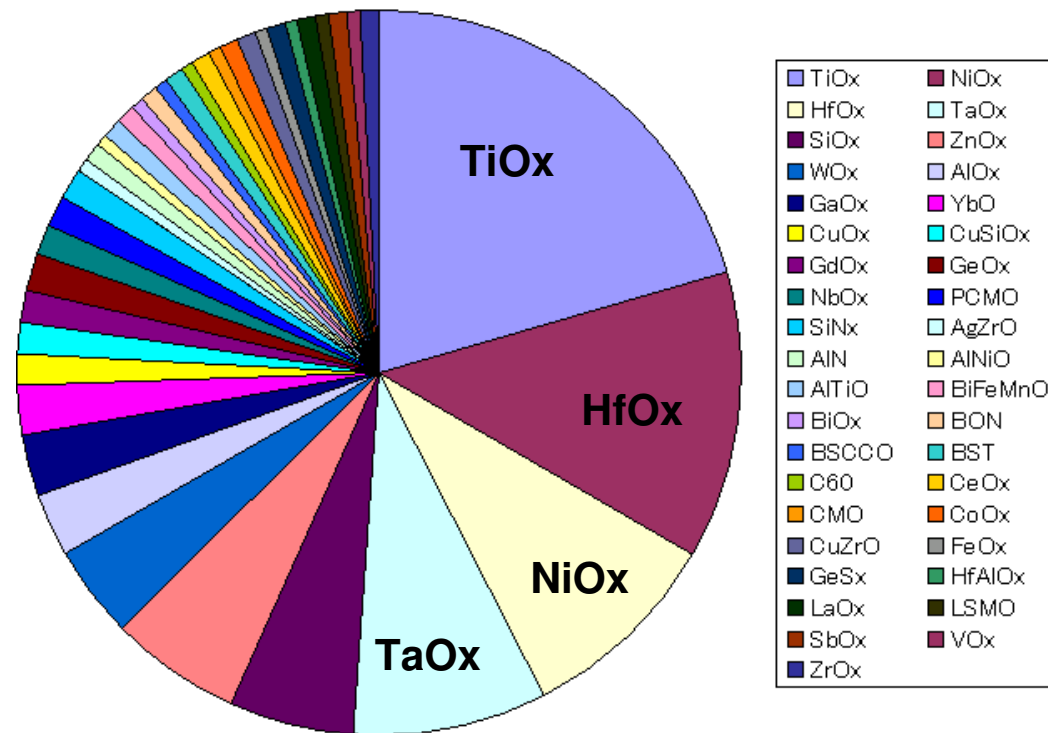
Switching Model for TaOx ReRAM

- Active area: One filament in the Ta₂O_{5-δ} layer
- Conduction : Electron hopping via oxygen vacancies
- Switching → The change of the density of V_o



Materials for ReRAM

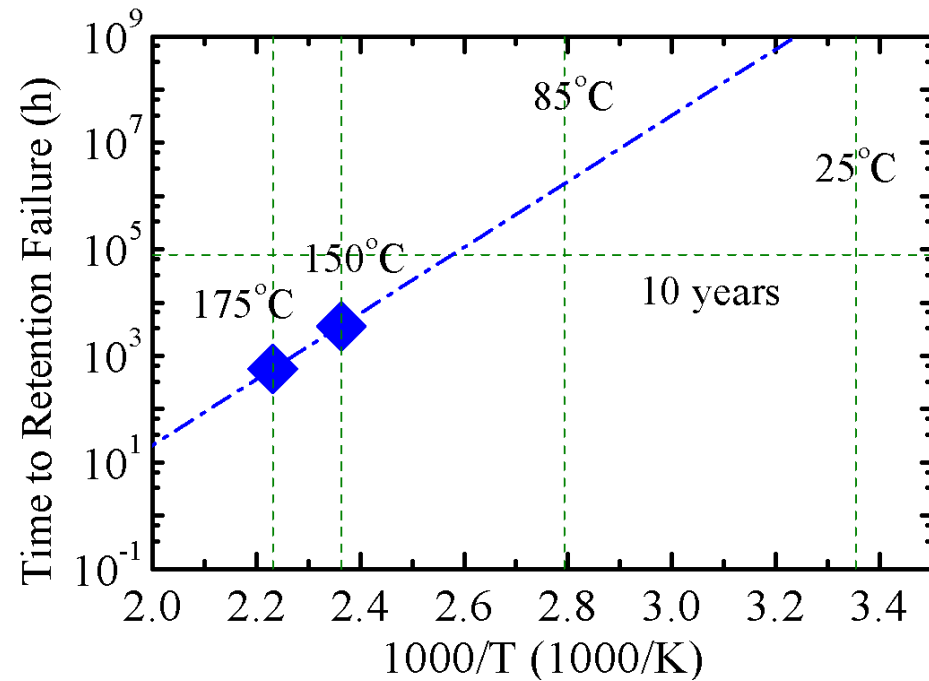
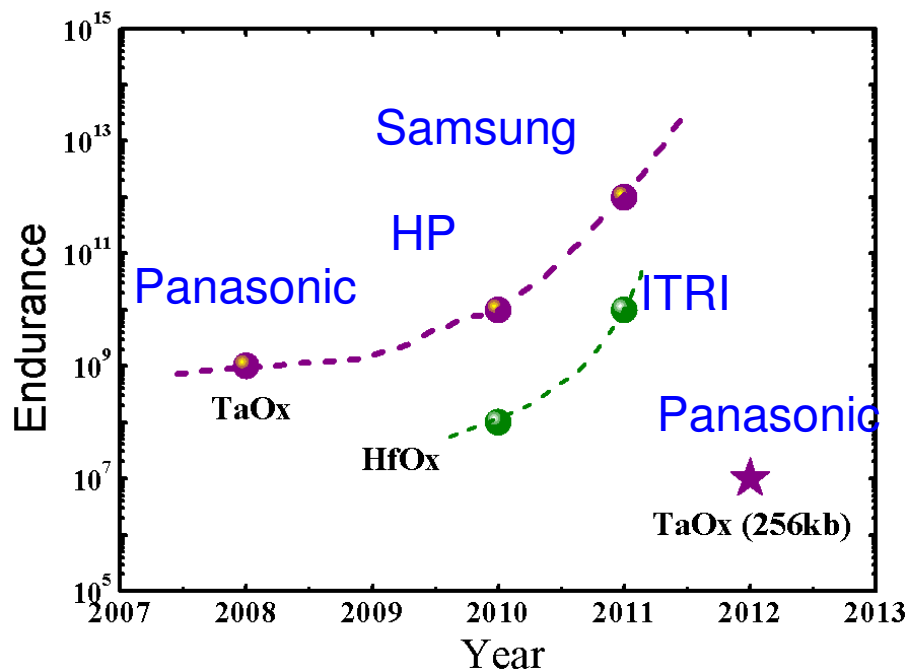
- Various materials show resistance switching
- Which one is suitable for ReRAM ?



Materials for ReRAM (Google scholar 2012.1-2012.12)

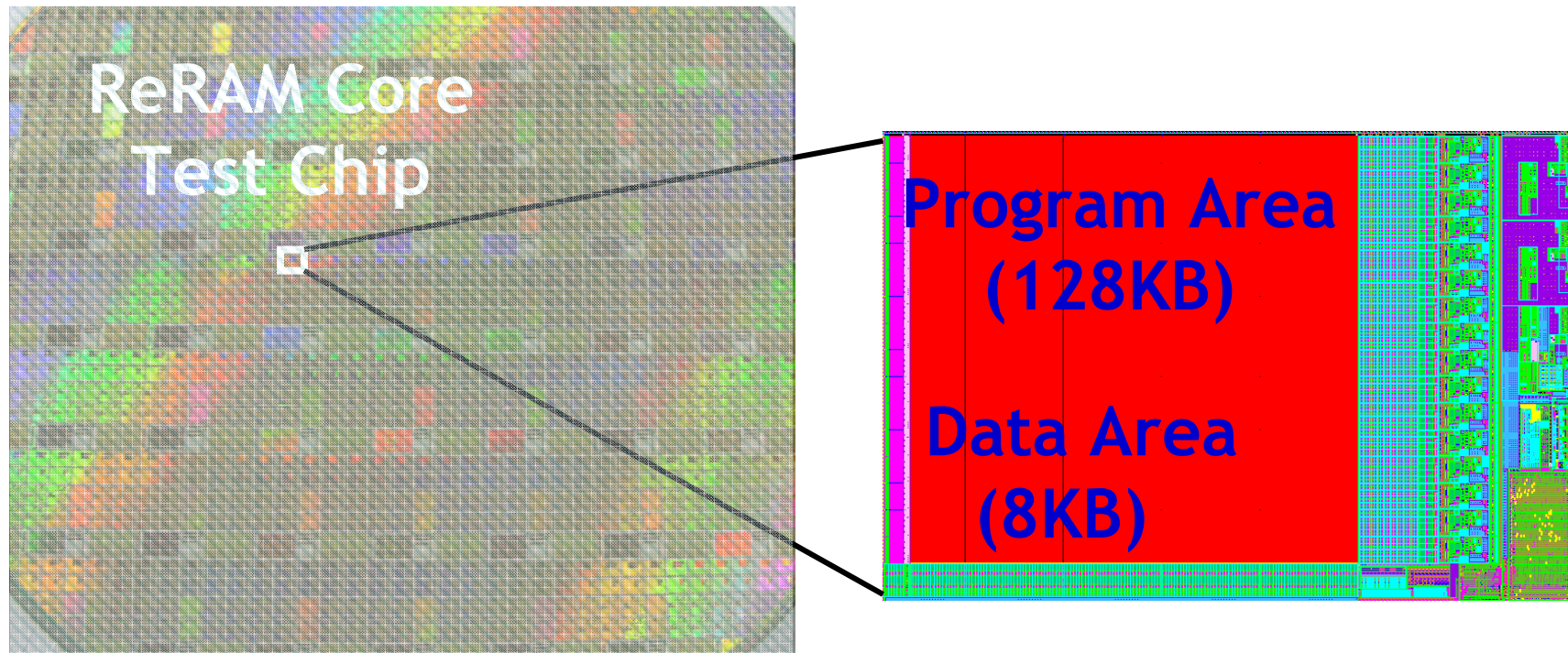
TaOx ReRAM

- Long Endurance Capability of TaOx ReRAM
- Retention period of the 256-kbit array including tail bits is more than 10 years at 85°C.



TaOx ReRAM

- **Microcontroller chip with embedded ReRAM to be mass-produced by 2013**





TaOx ReRAM

~~● Mechanism is still unclear~~

Redox Reaction in Filament near Anode

~~● Any oxide is switchable~~

TaOx ReRAM shows high reliability

~~● Emerging Memory~~

To be mass-produced this year