NRAM; A Disruptive Carbon-Nanotube Resistance-Change Memory

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Advanced memory technology based on carbon nanotubes (NRAM®) has recently demonstrated the desired properties for implementation in a host of integrated systems due to its operational advantages including high speed (Nanotubes can switch state in picoseconds), high endurance (over 5 billion), robust retention (>300 years at 300C), and low power (with essential zero standby power). The applicable target markets that will see compound annual growth rates (CAGR) of over 62% between 2018 and 2023, with embedded systems CAGR of 115% in 2018 to 2023.[1] These opportunities for NRAM technology are helping drive a change from silicon to carbon-based memory. NRAM is made up of an interlocking matrix of carbon nanotubes, touching or slightly separated, leading to low or higher resistance states respectively. The small movement of atoms for NRAM, as opposed to electrons for traditional memories, renders NRAM with a more robust endurance and high temperature retention/operation which, along with high speed/low power, is expect to bloom in many memory applications to be disruptive for the current status quo of DRAM and NAND flash.

[1] http://www.bccresearch.com/pressroom/smc/bcc-research-predicts:-nram-(finally)-to-revolutionize-computer-memory