PURDUE INNOVATES | Office of Technology Commercialization

FETRAM- A Novel Organic Ferroelectric Based Random Access Memory

FETRAM is a CMOS-compatible nonvolatile memory technology that offers greater storage capacity, enhanced endurance, and faster writing capabilities than existing solutions, enabling lower-cost fabrication for high-speed computer applications.

The demand for nonvolatile random access memory (NVRAM) is rapidly increasing as high performance personal computers, smart phones, and gaming consoles become increasingly integrated and essential. The current need for nonvolatile computer storage relies primarily on flash memory. Flash memory suffers from problems of higher power consumption, slower write performance, and significantly less endurance than new NVRAM technology. The next generation of NVRAM technology is ferroelectric random access memory (FeRAM). FeRAM boasts faster writing capability and greater endurance than flash; however, the current state of FeRAM faces issues with storage capacity, processor compatibility, and cost.

Researchers at Purdue University have addressed the current problems in FeRAM technology and developed FETRAM (ferroelectric transistor RAM) technology. FETRAM retains the requisite nonvolatile, high endurance, and write performance of current FeRAM. FETRAM has been designed to be compatible with other complimentary metal-oxide-semiconductor (CMOS) devices. The design effectively increases packing density, leading to greater storage capacity. In addition to these advancements, materials used in FETRAM have lower processing temperature, which leads to less expensive fabrication techniques and lower production costs. Researchers have built and fully characterized a unique, fully functional, CMOS compatible memory cell using FETRAM technology. FETRAM memory cells have the potential to extend the application space for the FeRAM family to high speed CPU, hard disks, and stand-alone applications like smartphones.

Advantages:

-Enhanced compatibility

-Greater endurance

Technology ID

65866

Category

Semiconductors/Fabrication & Process Technologies
Semiconductors/Devices & Components
Materials Science & Nanotechnology/Advanced Functional Materials

Authors

Joerg Appenzeller
Saptarshi Das

Further information

Aaron Taggart
adtaggart@prf.org

View online

-Faster write performance

-Greater storage capacity

-Functional and fully characterized

Potential Applications:

-Materials

-Manufacturing

-Computer Technology

TRL: 4

Intellectual Property:

Provisional-Patent, 2011-04-29, United States | Utility Patent, 2012-04-30, United States | CIP-Patent, 2012-08-03, United States | CON-Patent, N/A, United States

Keywords: FETRAM, ferroelectric transistor RAM, FeRAM, ferroelectric random access memory, NVRAM, nonvolatile random access memory, nonvolatile computer storage, CMOS compatible memory cell, high speed CPU, flash memory, Electrical Engineering, Materials and Manufacturing, Semiconductors