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Flexible Solution-Processed TiO2-Based Memory[1] BARBARA DUNLAP, NADINE GERGEL-HACKETT, BEHRANG HAMADANI, JOHN SUEHLE, CHRISTINA HACKER, DAVID GUNDLACH, CURT RICHTER — We have fabricated flexible titanium dioxide memory devices using a room temperature spin-on titanium dioxide (TiO2) sol gel technique. These devices show a non-volatile memory behavior with on/off ratios up to 10,000:1 and can be switched between low and high current states by applying an adequate bias (less than 10 V). Once switched, the state can be read by applying a small bias (0.5 V). The device can then be set back to the previous current state by applying a bias that is equal in magnitude but opposite in polarity to the initial bias. Devices maintain on/off ratios greater than four orders of magnitude when flexed 4,000 times, still switch after being flexed 8,000 times, and hold their set state for longer than 1x10ˆ6 seconds. The advantages of our devices include that they are low power, rewritable, nonvolatile, lightweight, physically flexible, and they have a simple, inexpensive, two-terminal, room temperature processed device design.

[1]Work was done at the National Institute of Standards and Technology. Barbara Dunlap was a summer intern working at NIST through an internship with the Society of Physics Students.

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