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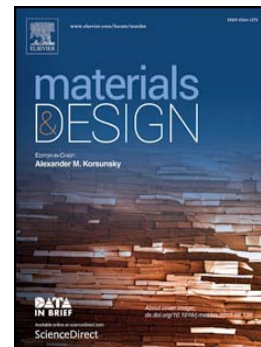
Top electrode-dependent retention characteristics of thin-film transistors with carbon nanotube/(Bi,Nd)₄Ti₃O₁₂ structure

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**Top electrode-dependent retention characteristics of thin-film transistors
with carbon nanotube/(Bi,Nd)₄Ti₃O₁₂ structure**

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Abstract

Gradient stripe patterns of Single-Walled Carbon Nanotubes (SWCNTs) were fabricated by using the evaporation-induced self-assembly technique. Additionally, the nonvolatile thin-film transistors (TFTs) with SWCNTs and (Bi,Nd)₄Ti₃O₁₂ (BNT) insulators were fabricated. The retention characteristics were investigated in Pt/SWCNTs/BNT/LaNiO₃ and LaNiO₃/SWCNTs/BNT/LaNiO₃ structures. Results revealed that LaNiO₃/SWCNTs/BNT/LaNiO₃ TFTs demonstrate larger on-state current, wider memory window, better fatigue endurance performance and retention characteristics, compared with Pt/SWCNTs/BNT/LaNiO₃ TFTs because of the involvement of the oxide conductive electrodes. These results suggest that the SWCNTs/BNT TFTs with LaNiO₃ as the electrodes are suitable for next-generation nonvolatile memory devices and integrated circuits.

Keywords: Thin-film transistors (TFTs), Single-Walled Carbon Nanotube (SWCNTs), Nonvolatile memory, Ferroelectric film

1. Introduction

Recently, Carbon Nanotubes (CNTs) ferroelectric thin-film transistors (TFTs) are

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