Iridium Nanocrystal Thin-Film Transistor Nonvolatile Memory with Si3N4/SiO2 Stack of Asymmetric Tunnel Barrier

吳建宏,王泰瑞,呂天麟,劉育成,Shih-Wei Hung,謝英家,Cheng-Tzu Kuo
Electrical Engineering
Engineering

Abstract

Iridium nanocrystals (Ir-NCs) lying on the Si3 N4 /SiO2 tunneling layer have been demonstrated and Ir-NC-assisted thin-film transistor nonvolatile memory devices were successfully developed. Results show that Ir-NCs with a number density of 6 x 1011 cm-2 and a particle diameter of 4
to 12 nm can successfully be fabricated as charge trapping centers. Owing to the asymmetric SiO2 /Si3 N4 tunneling layer that increases programming/erasing efficiency, a significant memory window of 5.5 V has potential to be applied to multibit memory devices. Furthermore, after 104 s, the memory window is still about 4.0 V in logic states.

Keyword：Iridium nanocrystals and nonvolatile memory devices