Iridium Nanocrystal Thin-Film Transistor Nonvolatile Memory with Asymmetric Tunnel Barrier

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Abstract

ridium nanocrystals (Ir-NCs) lying on the Si3N4/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× 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/Si3N4 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：thin film transistor nonvolatile