

Formation of Iridium Nanocrystals with Highly Thermal Stability for the Applications of Nonvolatile Memory Device with Excellent Trapping Ability

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Abstract

This paper presents the formation of iridium nanocrystals (Ir-NCs) embedded in SiO₂ matrix and it can be used for potential applications of nonvolatile memory devices. The NC formation is investigated by varying Ir film thickness; and the thermal agglomeration is also studied by applying various annealing temperatures and process time. The results of systematic characterization including capacitance-voltage, transmission electron microscopy, and x-ray photoelectron spectroscopy show that the high work-function (5.27 eV) metallic-NCs have a highly thermal stability (up to 900°C) and the resulted Al/SiO₂ /Ir-NCs/SiO₂ /Si/Al stack can have a good retention ability and significant hysteresis window of 17.4 V.

Keyword : nanocrystals