

Preparation and research of Gallium oxide by magnetron sputtering

Beqa Melua, Amiran Bibilashvili

e-mail: beqa.melua907@ens.tsu.edu.ge

Department of Physics, Faculty of exact and natural sciences, Ivane Javakjishvili Tbilisi State University,
I.Chavchavadze Ave.3, Tbilisi 0179, Georgia

In this study we present a low-temperature magnetron sputtering technology for obtaining thin films of Gallium oxide, a promising material in modern Micro-Nano and optoelectronics, carried out on a modernized setup. For the set objective, a substantive review of individual technological processes has been carried out. The films were deposited on silicone and sapphire substrates to measure various oxide parameters. The electro-physical and optical parameters of the oxides were characterized. Capacitance-Voltage (C-V) characteristics, surface work function and roughness were measured, and X-ray structural analysis was conducted. Due to high quality of the obtained films, a suitable technological route for obtaining memristor structures was developed and optimal processes were established. The Voltage-Current (I-V) characteristics of memristor was measured, which demonstrated high performance. The results were summarized and conclusions were drawn by establishing the high quality of the fabricated structures and the promising potential for using these materials in Micro-Nanoelectronics.

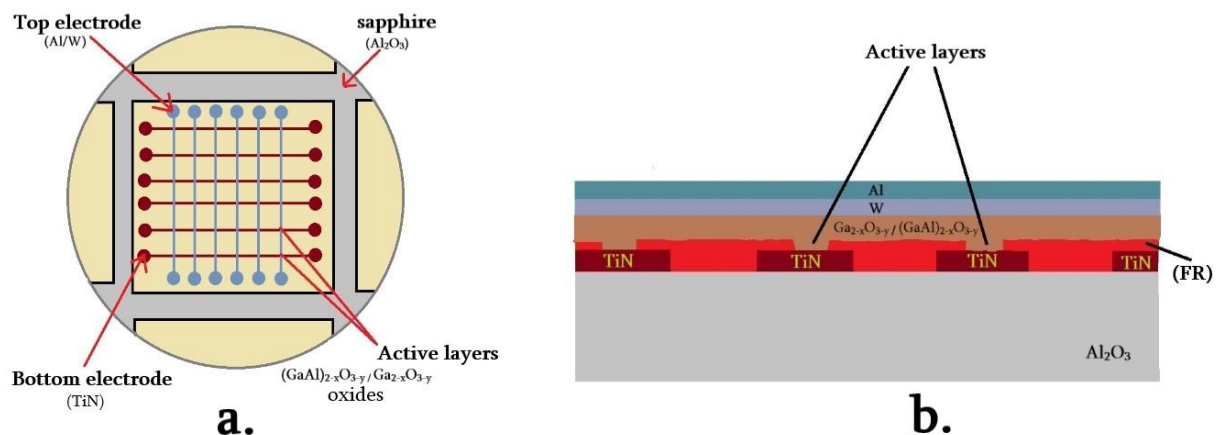


Fig.1 Developed memristor top view (a) and structure (b).