

Metal Oxide Semiconductor Nanostructures: From Growth to Devices**

Ahmad Umar

Advanced Materials and Nano-Engineering Laboratory (AMNEL) and Centre for Advanced Materials and Nano-Engineering (CAMNE), Najran University, P. O. Box 1988, Najran, 11001, Kingdom of Saudi Arabia

Abstract

Among versatile groups of semiconductor nanostructures, the metal oxide semiconductor nanostructures stand out as one of the most common, most diverse and most probably richest class of materials due to their extensive structural, physical and chemical properties and functionalities. Here, I will present the synthesis, chemical and biosensor, electronic devices and energy applications of various metal oxide nanostructures such as zinc oxide (ZnO), magnesium oxide (MgO), copper oxide (CuO), Nickel Oxide (NiO), Cobalt Oxide, Iron Oxide and some others. As among different metal oxide semiconductor nanostructures, ZnO is a key engineering material on its own merits such as high specific surface area, optical transparency, biocompatibility, non-toxicity, chemical and photochemical stability, ease of fabrication, and so on, hence more emphasis will be given to ZnO in this talk. Various kinds of chemical and biosensors and electronic devices such as single nanowire based field effect transistors (FETs), field emission devices (FEDs) based on metal oxide semiconductor nanostructures will be explored in this talk.