Abstract: Vertically well-aligned Ga-doped ZnO nanorods with different Ga contents were grown by thermal evaporation on a ZnO template. The Ga-doped ZnO nanorods synthesized with 50 wt% Ga with respect to the Zn content showed maximum compressive stress relative to the ZnO template, which led to a rapid growth rate along the c-axis due to the rapid release of stored strain energy. A further increase in the Ga content improved the conductivity of the nanorods due to the substitutional incorporation of Ga atoms in the Zn sites based on a decrease in lattice spacing. The p-n diode structure with Ga-doped ZnO nanorods, as a n-type, displayed a distinct white light luminescence from the side-view of the device, showing weak ultraviolet and various deep-level emissions.

Key Words: Ga-doped ZnO; Nanorods Thermal evaporation Diode Catalyst free