I-V characterization of p-n heterostructures obtained by GLAD

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In recent years, the development of gas monitoring devices/sensors are critical for environmental protection and for humans promptly. Due to their good characteristics as fast response, low cost, and small size gas sensors have become more prevalent in different fields from healthcare industries to food processing [1].

In breath sensing, metal oxide semiconductor (MOS) sensors are commonly utilized. MOS sensors are one of the finest alternatives for breath analysis because of its compact size, ease of operation, low cost, and minimal maintenance. However, conventional gas sensors with a single metal oxide layer, detect a shift in bulk resistance in response to gas contact, resulting in limited gas

sensitivity and selectivity. For increasing gas sensitivity and selectivity, forming a p-n junction with MOS-based p-type and n-type electrodes is the best option [2].

This research purpose to investigate gas sensor based on p-n junction heterostructures of MOS (TiO/CuO) with nanoscale architecture which is ultrasensitive for acetone and work at low temperature (room temperature). It is possible to achieve by control over nanoscale architecture of the sensing material and increasing surface area.

The GLAD technique has been tested for nanords synthesis for gas sensors. The GLAD refers to a configuration in which the material flux arrives at the surface of a substrate at an oblique angle [3].

The nanoscale array, fabricated by GLAD between top and bottom electrodes, shows p-n junction current-voltage (I–V) characteristics at room temperature and 75C.

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