Short Communication

Effect of Light on the Sensitivity of CuS Thin Film EGFET Implemented as pH Sensor

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The lightness and darkness affect the sensitivity of thin films considered as extended-gate field-effect transistor (EGFET) for pH sensor, for this reason the research work was investigated to study these effects for CuS thin film. CuS thin film prepared by copper chloride and sodium thiosulfate using deionized water as a solvent, deposited on a glass substrate by spray pyrolysis deposition. The structural properties were studied through X-ray diffractometer, and the morphological properties were studied through field emission scanning electron microscopy. Then this thin film was used as an extended gate of the field effect transistor to be implemented as pH sensor. The sensitivity was measured for this extended gate under two conditions; dark and light source. The results showed the highest sensitivity (23 mV/pH) and less hysteresis (2.6 mV) and drift (13.1, 73.5 and 85.8 for pH4, pH7 and pH10, respectively) of the sensor in dark. While under high-intensity white light the sensitivity was (19 mV/pH) and the hysteresis had the value (5.2 mV) and drift values were (21.7, 155.8 and 90.4 for pH4, pH7 and pH10, respectively). This confirmed that the extended gate of the field effect transistor is sensitive to light, and the light decreased the pH sensitivity.

Keywords: CuS thin film; EGFET; light; sensitivity; pH sensor.

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