

## Review on: TiO<sub>2</sub> thin film as a metal oxide gas sensor

Titanium dioxide is an important metal oxide semiconductor (MOSs) used in many electronic applications, the most famous of which are gas sensor applications. This review discusses the techniques used for preparing the TiO<sub>2</sub> thin films and the effect of the crystalline phases in which this compound forms, on the gas sensing properties. There are three phases to crystallize titanium dioxides, brookite, anatase, and rutile phase. Amongst these varied phases of crystal, the greatest steady main phase is rutile. The phase of anatase and brookite are usually more stable than the rutile phase as the surface energy of them is less than that of the rutile. Therefore, the applications of sensing by anatase TiO<sub>2</sub> and rutile TiO<sub>2</sub> were fully studied. TiO<sub>2</sub> characterizations were established on surface reactions using oxidizing or reducing gases, which; therefore, influences the conductivity of the film. Titanium dioxide gas sensors have healthier steadiness and sensitivity at high temperature compared with that of the other metal oxides. Surveys on titanium dioxide thin film applied in gas sensor devices used in a varied range of applications such as sensor devices, dye-sensitized solar cells, and catalysis. The gas sensor is a function of the crystal structure, particle size, morphology, and the method of synthesis. In this work, characteristic of the titanium dioxide films investigated using various techniques, as reported by many researchers. The aim of this study was to review previous studies through which the best properties can obtained to manufacture TiO<sub>2</sub> gas sensor thin films with high sensitivity. DOI: 10.33945/SAMI/JCR. 2020.2. 4