

## 掺入SiO<sub>2</sub>纳米颗粒对厚膜ZnO气敏传感器气敏性能的影响

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摘要:

利用丝网印刷技术, 制备出掺入SiO<sub>2</sub>和未掺入SiO<sub>2</sub>的ZnO厚膜气敏传感器, 测试对甲醇和乙醇的气敏性能, 并用场发射扫描电子显微镜 (FESEM) 来分析表征膜的微观形貌。结果表明SiO<sub>2</sub>的掺入有效地抑制了ZnO晶粒的长大。在工作温度为400℃时, SiO<sub>2</sub>的掺入显著提高了ZnO厚膜气敏传感器对测试气体的敏感度, 在工作温度为200-350℃时, SiO<sub>2</sub>的掺入明显抑制了ZnO厚膜气敏传感器对测试气体的敏感度。另外, SiO<sub>2</sub>的掺入使气敏传感器的响应时间和恢复时间都显著延长了。最后, 厚膜气敏传感器的气敏机理也被进行了讨论。

关键词: ZnO; 厚膜; 气敏传感器; SiO<sub>2</sub>

## Effect of SiO<sub>2</sub> Doping on Thick Film ZnO Gas Sensor

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**Abstract:**

SiO<sub>2</sub> doped and undoped ZnO thick film gas sensors were prepared using screen printing technique and tested for their methanol and ethanol gas sensitivity. Morphology properties of the thick film are studied using field emission scanning electron microscopy (FESEM). The results show that doping with SiO<sub>2</sub> is quite effective in restraining growth of ZnO grains. SiO<sub>2</sub>-doping enhanced the sensitivity of thick film ZnO gas sensor to the test gases at the operating temperature of 400°C. However, the sensitivity of thick film ZnO gas sensor to the test gases was restrained, when the operating temperature was between 200 and 350°C. Furthermore, the response and recovery time of SiO<sub>2</sub>-doped ZnO was always longer than that of pure ZnO. Finally, the sensitive mechanism of the thick film gas sensor was analyzed and discussed.

**Keywords:** ZnO; thick film; gas sensor; SiO<sub>2</sub>

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