

基于ZnO传感器的高流速气体压力测试

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摘要:

针对机械系统中气体轴承间气膜压力的分布检测, 提出并研发了一种基于ZnO传感器的检测方法。先采用化学沉淀法, 制备了ZnO纳米颗粒; 并应用X射线衍射、扫描电镜对样品进行了表征; 利用ZnO传感器的氧气吸附、压电效应、热传导等检测原理, 成功测试出高压动态气体的压力, 得出了各影响因素的相互强弱, 并拟合出了对应的压力—输出电压关系曲线。这种测试方法具有简单、准确和快速的优点; 实验结果具有直观和重复性好等特点; 为高流速气体压力的测试提供了一种新方法。

关键词: 氧化锌; 纳米颗粒; 气体压力; 高流速;

Sensing gas pressure based on ZnO sensor under high flow rate

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Abstract:

A new detection method based on ZnO sensors was brought forward and devised to detect and measure the gas pressure distribution for mechanical system gas bearing film pressure. ZnO nanopowder was prepared by a route of chemical precipitation, and characterized by XRD and SEM. High-velocity, pressure gas was detected successfully and the pressure- output voltage curve was draw according to the oxygen chemisorption, piezoelectric effect and heat conduction mechanism. The test had the following characters: facile operation, accurate value, quick response, visually results, and good repeatability, providing a new method for detecting the gas with high pressure and flow rate.

Keywords: Zinc oxide; nanomaterials; gas pressure; high flow rate;

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