

NiO电极中YSZ添加量对NO_x传感器气敏性能的影响

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摘要:

以钇稳氧化锆(简称YSZ, yttria-stabilized zirconia)为固体电解质, 添加不同摩尔比例YSZ的NiO+YSZ混合体为敏感电极材料, 通过丝网印刷技术制备了相应的混合电势型NO_x传感器。采用XRD和SEM手段对NiO混合物进行了物理性能分析, 利用电势和阻抗测量设备对传感器样品的输出电势(EMF)和交流阻抗等电学参数随NO浓度的变化进行了研究。结果显示: NiO+YSZ的混合体中, 物相独立, 没有新相产生; 在相同NO检测环境下, 敏感电极中YSZ所占摩尔比例为20mol.%时传感器的响应电势最大且在0.01Hz~100kHz范围内的阻抗谱最小, SEM也显示此时具有很好的TPB。

关键词: NO_x传感器; NiO; YSZ; 气敏性能

Affection of YSZ amount in NiO electrode to the gas-sensing properties of NO_x sensor

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Abstract:

Several mixed-potential-type NO_x sensors were prepared by means of screen-printing technique using yttria-stabilized zirconia(8YSZ, 8%mol Y₂O₃ doped) as electrolyte and some powders obtained by the NiO mixed with different proportion of YSZ as electrode material. The physical characteristics of sensors was analyzed by X-ray diffraction (XRD) and scanning electron microscope (SEM). Dependences of electromotive force (EMF) and complex impedance on the NO_x concentration were studied by corresponding testing equipments, respectively. The results showed that the phase of NiO or YSZ is single and no new phase is formed; under the same testing environment containing NO, the potential response of the sensor is maximum and the impedance of that in the context of 0.01Hz ~ 100kHz is minimum when the molar ratio of YSZ share 20mol.% in sensitive electrode, SEM also shows a very good three-phase interface at the same time.

Keywords: NO_x sensor; NiO; YSZ; Gas-sensing properties

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