

论文

修饰LB膜法制备的PEDOT薄膜对HCl气体气敏性的影响

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摘要:

以二十烷酸(AA)LB膜为模板, 通过3,4-乙烯二氧噻吩(EDOT)单体在LB膜亲水基团间聚合, 采用垂直拉膜方式在叉指电极上制备了不同层数的AA/PEDOT膜, 并对HCl气体在AA/PEDOT复合LB膜中的作用进行研究, 结果表明, 膜厚、处理温度、拉膜膜压对AA/PEDOT复合LB膜的HCl气体敏感性能有不同程度的影响. 在较小气体体积分数范围(20~60 μL/L)内, AA/PEDOT多层有序膜对气体表现出非线性响应特性, 而在较高浓度范围内则表现出线性响应特性. AA/PEDOT复合LB膜对30 μL/L HCl气体的响应时间约为20 s, 远快于普通PEDOT旋涂膜(约为80 s), 同时在膜压达到45 mN/m时, AA/PEDOT膜的敏感性能反而下降. 敏感机理解释为电子在PEDOT共轭系统和氧化性气体间的转移.

关键词: 3,4-聚乙烯二氧噻吩 LB膜法 气敏性能

Effects of HCl Gas on Gas Sensitivity of PEDOT Prepared via Modified LB Film Method

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Abstract:

An arachidic acid(AA)/poly(3,4-ethylenedioxythiophene)(PEDOT) multilayer LB film was prepared via a modified LB film method. The theories were utilized to explain the effects of HCl gas on the gas sensitivity of PEDOT LB film. The gas sensitivity mechanism of PEDOT multilayer film can be explained by the charge transfer between π system of PEDOT and oxidization HCl system. The gas sensitivity of PEDOT LB film deposited interdigital electrode to HCl was tested. The results show that film thickness, treating temperature, deposition speed have different influences on the film gas sensitivity. The AA/PEDOT film deposited device exhibited nonlinear behavior to HCl gas at a lower volume fraction(20—60 μL/L) and linear response behavior at a higher gas concentration was observed. The time of the compound LB film of the AA/PEDOT responding to the 30 μL/L HCl gas is about 20 s, it is far quicker than that of the PEDOT-PRESS film(is about 80 s). When the film press attains the 45 mN/m, the sensitivity of the AA/PEDOT film descends on the contrary.

Keywords: Poly(3,4-ethylenedioxythiophene)(PEDOT) LB film method Gas sensitivity

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