

Gas Adsorption Performance of Organic Thin Films Prepared by Plasma-Assisted Vacuum Evaporation with Polyimide Precursors

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(Received January 26, 2010; accepted May 13, 2010)

Key words: plasma, vacuum evaporation, quartz crystal microbalance, polyimide

Organic thin films were deposited onto a quartz crystal with pyromellitic dianhydride (PMDA) and oxydianiline (ODA) by vacuum evaporation with or without argon plasma, and adsorption properties on these thin films for volatile organic compounds (VOCs), i.e., acetone, acetaldehyde, toluene, methyl salicylate, and some types of alcohol, were evaluated using a quartz crystal microbalance (QCM), to investigate their potential as gas sensors. The number of adsorbed gas molecules increased with decreasing molecular weight on each organic thin film. Furthermore, the numbers of adsorbed gas molecules on the organic thin films deposited by vacuum evaporation with argon plasma were higher than those on the organic thin films deposited by vacuum evaporation without the plasma. The numbers of adsorbed gas molecules on both the polyimide thin films with and without argon plasma decreased with increasing temperature in the adsorbed-gas-measuring system.

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