Contribution ID: **402** Type: **Oral Presentation**

Electrical properties of Hg/n-Si (MS) and Hg/PO3/n-Si (MIS) Schottky Diodes

Thursday, 10 July 2014 10:20 (20 minutes)

Abstract content
   (Max 300 words)
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Metal-semiconductor (MS) and metal- insulator-semiconductor (MIS) Schottky barrier diodes were studies using 4-cyanobenzyl phosphonate (PO3) monolayer. The insulator was deposited on n-Si(111) through a chemical process. Electrical parameters of the Hg/n-Si(111), MS and Hg/PO3/n-Si, MIS contacts were obtained from the forward and the reverse bias current-voltage (I-V) and capacitance-voltage (C-V) measurements performed using a mercury (Hg) probe at room temperature. Experimental results show no rectification behavior for the MS and rectification for MIS diodes. The ideality factor (n) and the zero-bias barrier height (ΦBo) were determined as 5 and 0.44 eV for the MS. In addition, the values of n and ΦBo for MIS were determined as 1.2 and 0.68 eV using I-V measurements and then the ΦBo of 0.64 eV was measured with C-V. C-V measurements for the MS diodes did not yield results due to low barrier height.

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Session Classification: DPCMM1

Track Classification: Track A - Division for Physics of Condensed Matter and Materials