Abstract Submitted
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Surface and interface trapping of low energy positrons at a graphene / Cu interface measured using depth resolved Doppler Broadening Spectroscopy (DBS)[1] M D CHRYSLER, V A CHIRAYATH, R W GLADEN, A J FAIRCHILD, A R KOYMEN, A H WEISS, Univ of Texas, Arlington — We report Doppler broadening spectroscopy (DBS) measurements on 6-8 layers graphene on polycrystalline Cu substrate and on polycrystalline Cu using a variable energy (˜2 eV to 20 keV) positron beam system. The 511 keV gamma annihilation line shape is parameterized using S and W-parameters, defined as ratios of the peak and wing regions to the total area of the 511 keV peak, respectively. Chemical information from the site of positron annihilation was derived by taking the ratio of the 511 keV annihilation gamma spectrum collected at various positron energies with respect to the annihilation spectrum collected from polycrystalline Cu. For higher positron energies, the S and W parameters as well as the ratio plots indicate that positrons are trapping at the interface between the multilayer graphene overlayer and Cu. The variation of S (W) parameters as a function of incident positron energy showed a peak (dip) at ˜5eV which correlates with a peak in the positronium formation from multilayer graphene. Present investigations are pointing towards a resonant positron neutralization process involving a surface plasmon excitation, though more theoretical and experimental studies are required to confirm this.

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