Abstract Submitted
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Au nanoparticles improve amorphous carbon to be gas sensors KENG-WEN LIU, JIAN-HENG LEE, HSIUNG CHOU, TZU-CHING LIN, SI-TING LIN, Dept. of Physics, NSYSU, Kaohsiung 804, Taiwan, SHIH-JYE SUN COLLABORATION[1] — In order to make the amorphous carbon possess the gas sensing capability transferring some sp3 orbits to sp2 is necessary. It is proposed that the metallic materials having a large charge exchange with sp3 carbon orbits are being catalysts to transfer the carbon orbits. We found embedding gold nanoparticles to the amorphous carbon will induce many compact sp2 orbits around the nanoparticles, which make the amorphous carbon be the candidate material for the gas sensors. The orbits of amorphous carbon near the interface of Au nanoparticles can be changed from sp3 to compact sp2 to reduce the surface energy of Au nanoparticles. Meanwhile, our molecular dynamics simulation has confirmed the fact, when an Au nanoparticle is embedded in the amorphous carbon system the ratio of sp2 orbits increases dramatically. Similar results also have been confirmed from the Raman spectrum measurements. We controlled the carrier transport by changing the hopping barriers formed by amorphous carbon matrix between the Au nanoparticles to modify the resistance. These nanocomposites exhibit a superior sensitivity to NH_3 at room temperature as well as good reproducibility and short response/recovery times, which could have potential applications in gas sensors.

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