Title:	Investigation of nano-carbon/ non-carbon material interfaces for electronics and renewable energy conversion applications
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Abstract:	Interface investigation of nano-carbon/non-carbon material is an interesting topic of research. Depending of the different interface properties leads to the different application. Here in this work, we have studied different interface of carbonaceous material (Graphene, CNT, NGQD) along with non-carbon material which could have potential application in the field of electronics and renewable energy conversion. The seamless interface between graphene-CNTs create a low resistive path via forming C-C covalent bonds which leads to higher field emission properties in terms of high current density (236 mA/cm2) and field enhancement factor (β~ 41315) which is tailored by~ 4-fold as compared to bare CNT mat. Using the concept of seamless carbonaceous matrix for the facile root of electronic transition, further pπ-pπ stacking concept has been adopted for graphene-g-C3N4 matrix which intern provide to developed highly liner piezoresistive strain sensor with a small gauge factor (1.89). Alternatively, similar interface via pπ-dπ co-ordination between carbon and metal phosphide interface i.e., 3D graphene with Cu3P-g-C3N4 makes the suitable electrocatalyst for overall water splitting with the cell voltage of 1.54 V to achieve a current density of 10 mA/cm2 can emerge a new domain for renewable energy management. In addition, pπ-pπ interaction between carbonaceous material along with Si and non-transition metal phosphide/oxide can potentially developed a new platform to designing novel PEC technology. The pours seamless graphene-CNTs matrix along with d-d coupled mixed transition bimetal metal phosphide/non-transition metal phosphide proved to be a suitable matrix for developing alternative PEC technology.
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