Supporting Information

Large Scale N-doped GNTs@a-SiO$_{x(x=1-2)}$ NPs: Template-free one-step synthesis, field emission and photoluminescence properties

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Figure S1 Nyquist plots of the N-doped GNTs, N-doped GNTs@a-SiO$_{x}$ (1:1), N-doped GNTs@a-SiO$_{x}$ (1:2) grown on graphitic substrate, and the bare graphitic substrate (Insert shows the enlarged parts of Nyquist plots).
Vacuum level

\[ \Phi = 5.0 \text{ eV} \]

\[ \Phi = 5.3 \text{ eV} \]

\[ E_f \text{ N-doped GNTs} \]

\[ E_f \text{ SiO}_x (x=1-2) \]

\[ E_g = 9.0 \text{ eV} \]

\[ \chi = 0.8 \text{ eV} \]

N-doped GNTs \hspace{1cm} \text{SiO}_x (x=1-2)

**Figure S2** Schematic band diagram of field emission for the N-doped GNTs@a-SiO$_x$(x=1-2)NPs
Figure S3 (a) high resolution SEM image of N-doped GNTs@a-SiO$_{(x=1−2)}$NPs (1:1) after FE studies , (b) high resolution SEM image of N-doped GNTs@a-SiO$_{(x=1−2)}$NPs (1:2) after FE studies