Electronic supplementary Information

Peroxidase mimetic activity of fluorescent NS-carbon quantum dots and its application for colorimetric detection of H_2O_2 and glutathione in human blood serum

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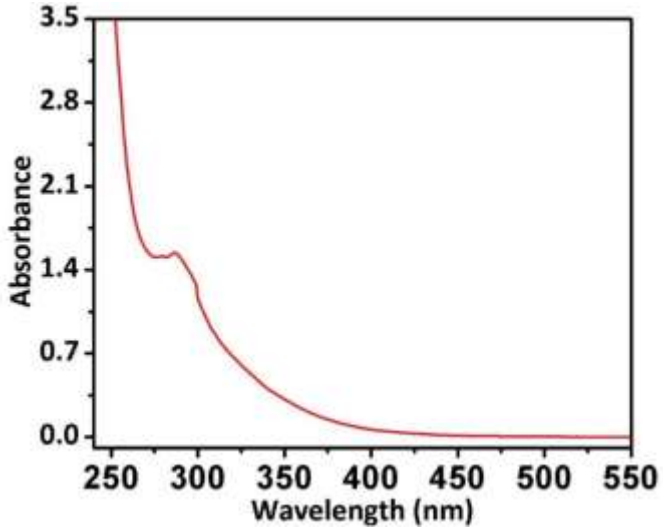

Figure S1. UV-visible absorption spectra of as synthesized NS-CQDs

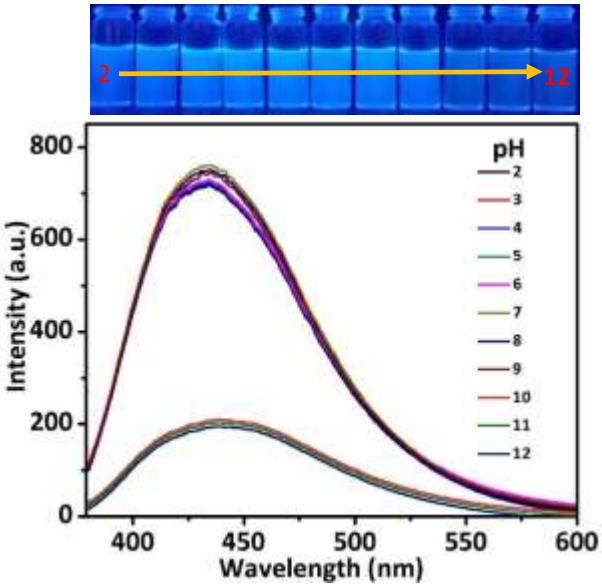

Figure S2. Effect of pH on the emission intensity of NS-CQDS with corresponding photograph under UV – light (λ_{ex} = 365 nm) in the pH range 2 to 12.

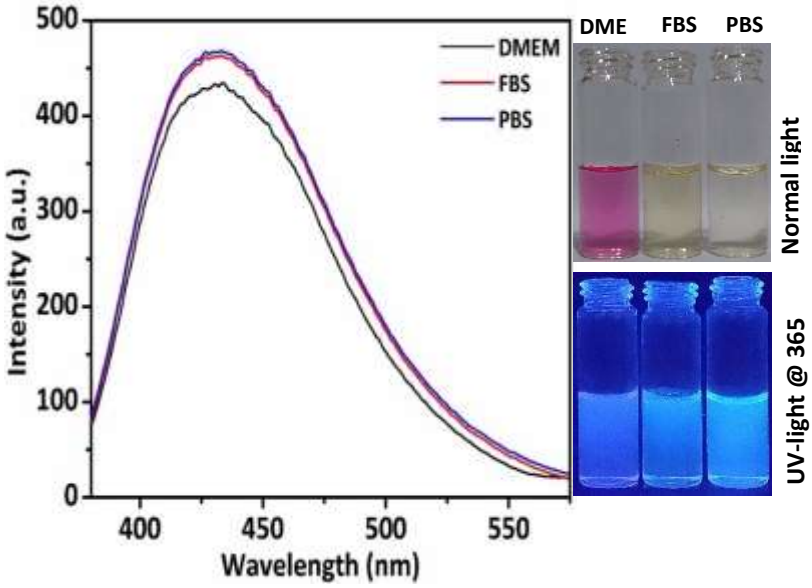

Figure S3. Fluorescence spectra of NS-CQDS in different medium (DMEM, FBS, PBS) and its photograph under normal light and UV- light @365 nm showing high stability and well dispersity.

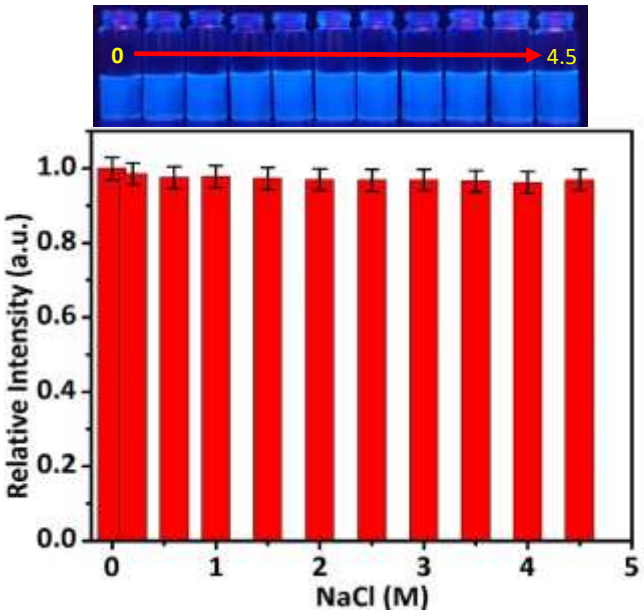

Figure S4. Effect of ionic strength in term of NaCl concentration on emission intensity of NS-CQDS with corresponding photograph under UV-light (λ_{ex} = 365 nm)

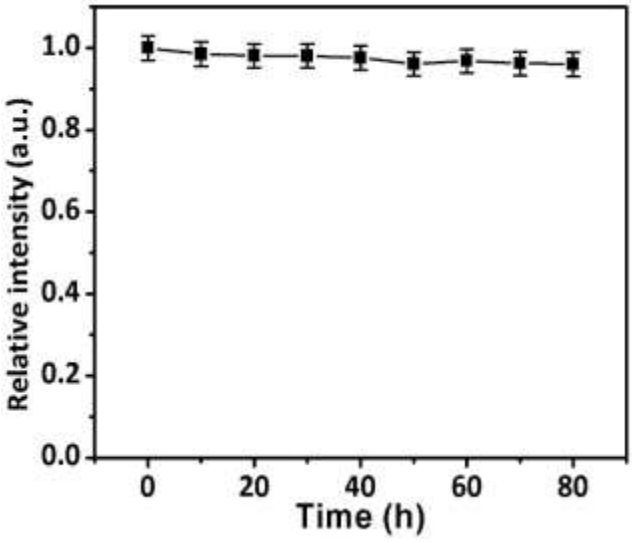

Figure S5. Photostability of as synthesized NS-CQDS after irradiation of UV- light for 80 h

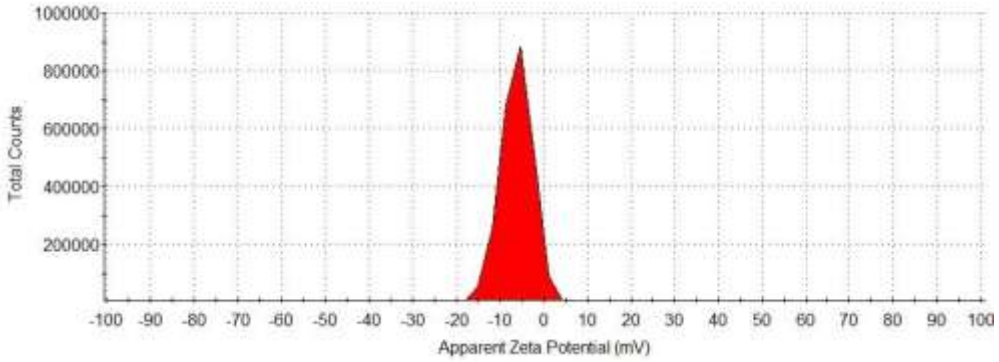

Figure S6. Zeta potential profile of as synthesized NS-CQDs

Table S1. Fluorescence quantum yield measurement with Integrated intensity and absorbance of quinine sulphate and NS-CQDs at excitation wavelength 360 nm.

Sample	Integrated intensity at 360 nm	Absorbance at 360 nm	Quantum Yield (%)
Quinine Sulphate (Reference)	56191.340	0.047	54
NS-CQDs	45210.201	0.044	46

Fluorescence Quantum yield was determined by using equation 1

$$\mathrm{QY} = \mathrm{QY_{ref}} \frac{\boldsymbol{\eta^2}}{\boldsymbol{\eta_{ref}^2}} \frac{\mathbf{I}}{\mathbf{A}} \frac{\mathbf{A_{ref}}}{\mathbf{I_{ref}}} \qquad \mathbf{1}$$

Where $\mathrm{QY_{ref}}$ is the quantum yield of the reference compound; η is the refractive index $(\frac{\boldsymbol{\eta^2}}{\boldsymbol{\eta_{ref}^2}} = 1)$ of the solvent; I is the integrated fluorescence intensity; and A is the absorbance. To minimize reabsorption effects, absorbance in the 1 cm fluorescence cuvette were kept under 0.1.

Beer–Lambert Law

The initial reaction rate was calculated using equation 2

$$C = A/\varepsilon b \qquad \mathbf{2}$$

where, c is the substrate concentration, A is the absorbance, b is the thickness of the solution.

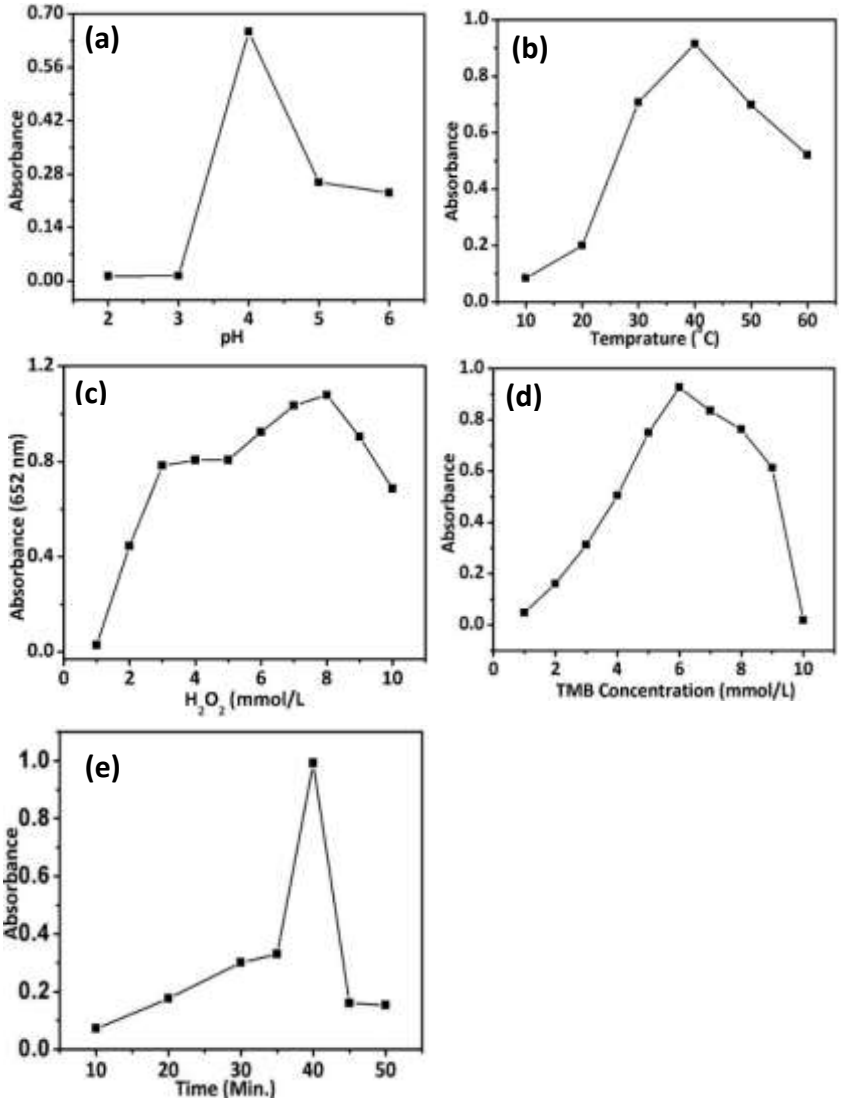

Figure S7. Optimized parameter for the oxidation of TMB at different (a) pH (b) Temperature (c) Concentration of H_2O_2 (d) Concentration of TMB and (e) Time respectively.

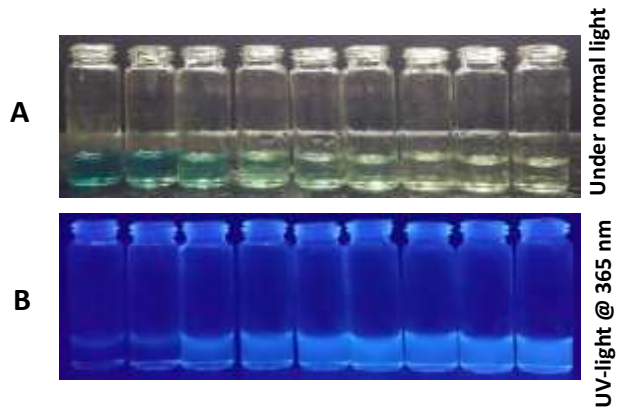

Figure S8. Photograph showed naked eye colour changed (panel A) and under UV- light @ 365n (panel B) after addition of different concentration of GSH in the ox-TMB solution.

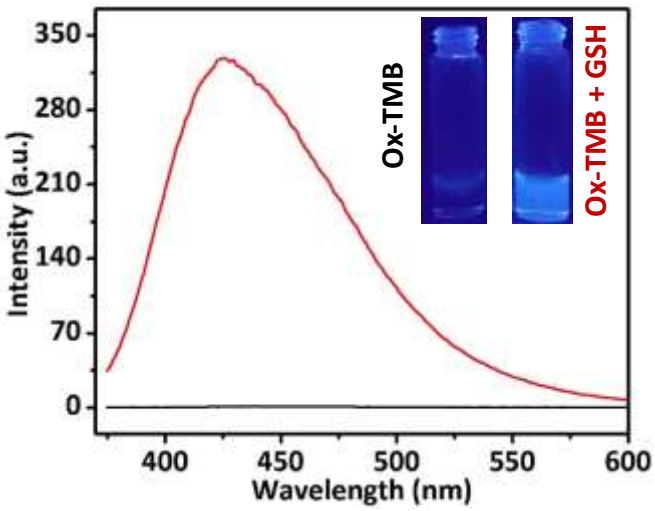

Figure S9. Fluorescence spectra of ox-TMB (black line) and ox-TMB + GSH (red line) at excitation wavelength 360 nm with turn on signal (inset photograph) showing turn on sensing of GSH.

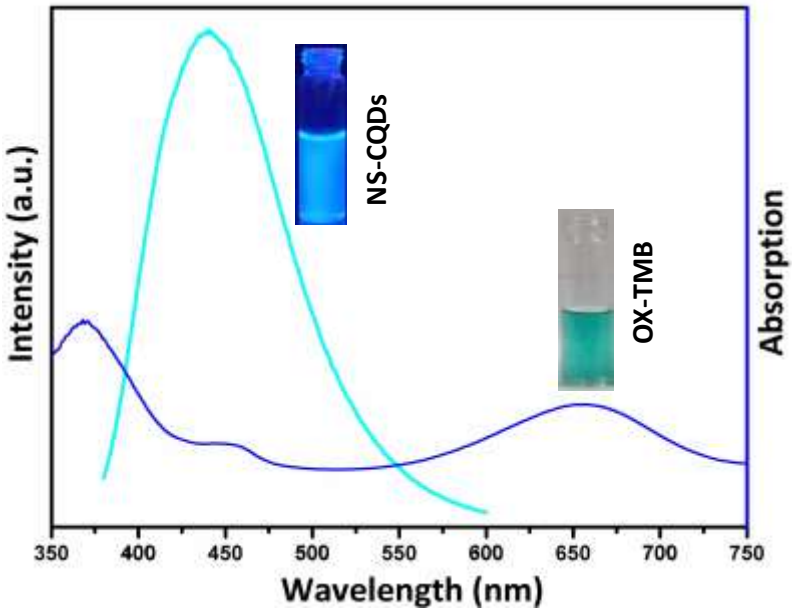

Figure S10. Absorption spectrum of Ox-TMB and emission spectrum of NS-CQDs. Inset shows the photograph of NS-CQDs under UV-light and ox-TMB under normal light.

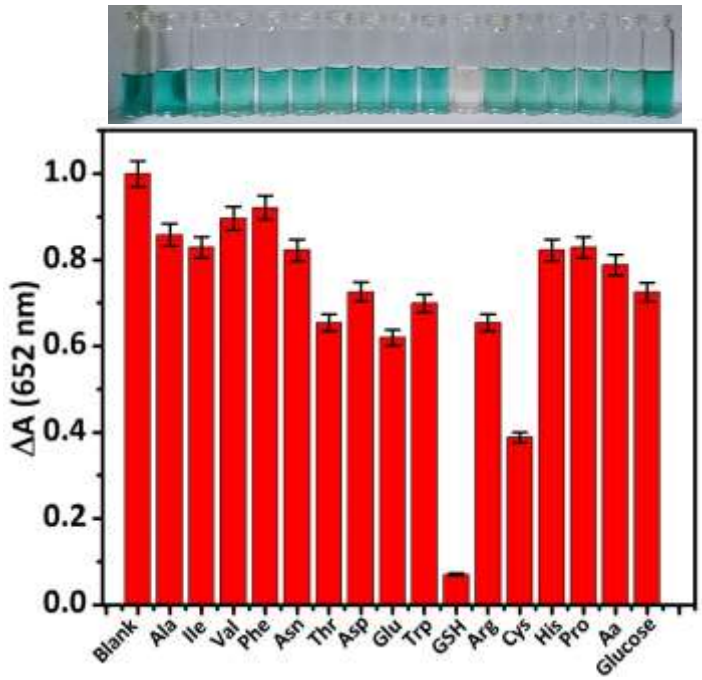

Figure S11. Bar diagram represent relative absorption of ox- TMB after addition of 50 µL (C, 10^{-4} M) of GSH and 100 µL (C, 10^{-3} M) of amino acid and glucose in ox- TMB solution at ambient condition indicating negligible interference and photograph showed corresponding colour change.