pH-induced Fluorescence Emission in Chlortetracycline and Signal Amplification using MoS_2 and WS_2 Quantum Dots

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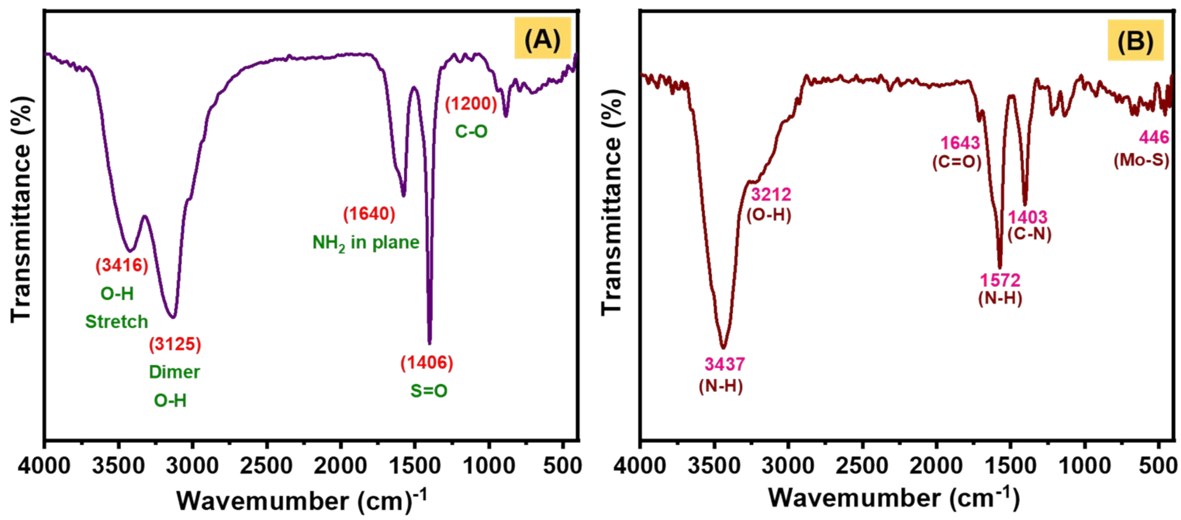

Fig. S1 FT-IR spectroscopy of (A) WS_2 QDs and (B) MoS_2 QDs.

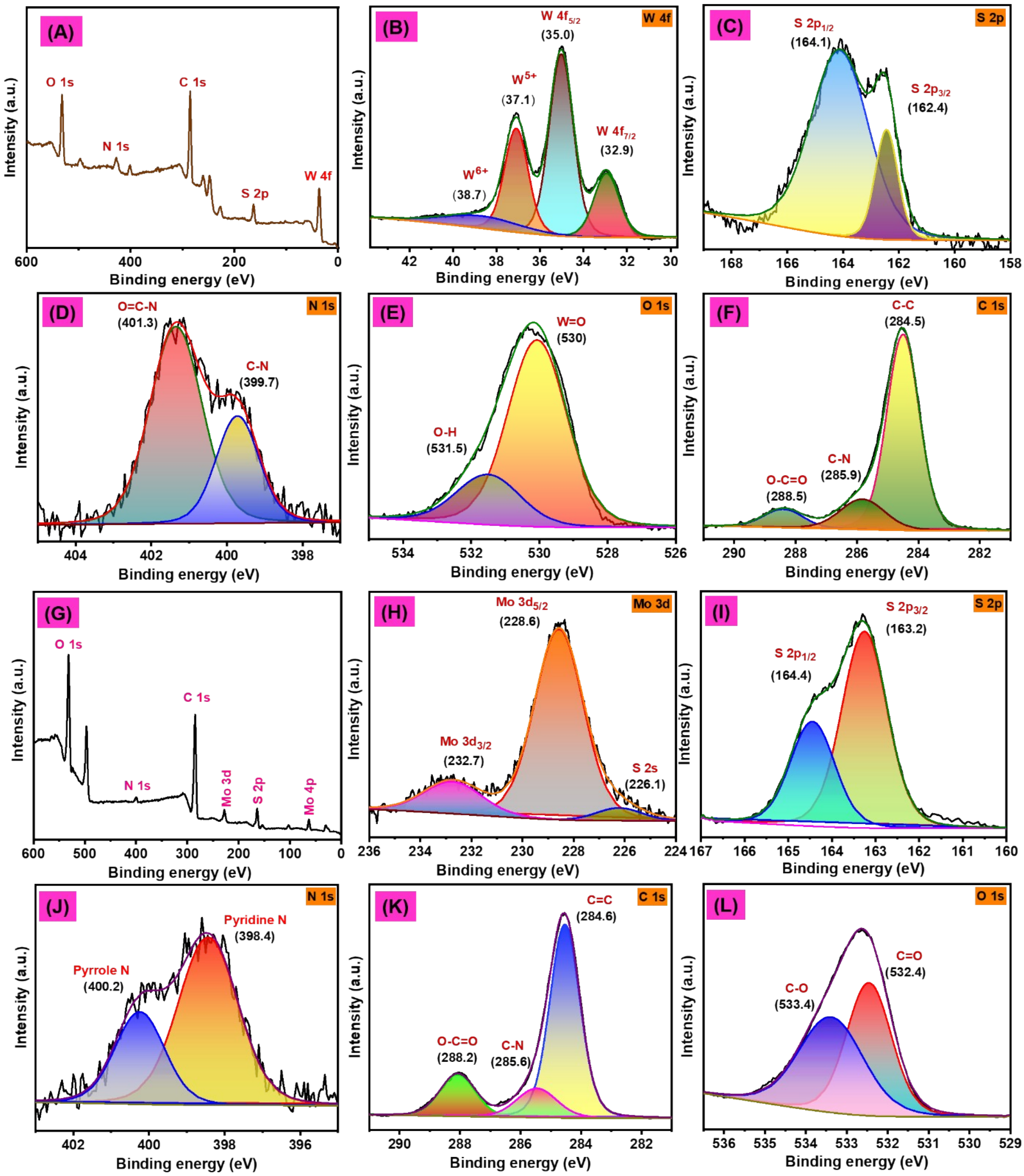

Fig. S2 X-ray photoelectron spectroscopy (XPS) spectra of synthesized WS_2 QDs (A-F) and MoS_2 QDs.

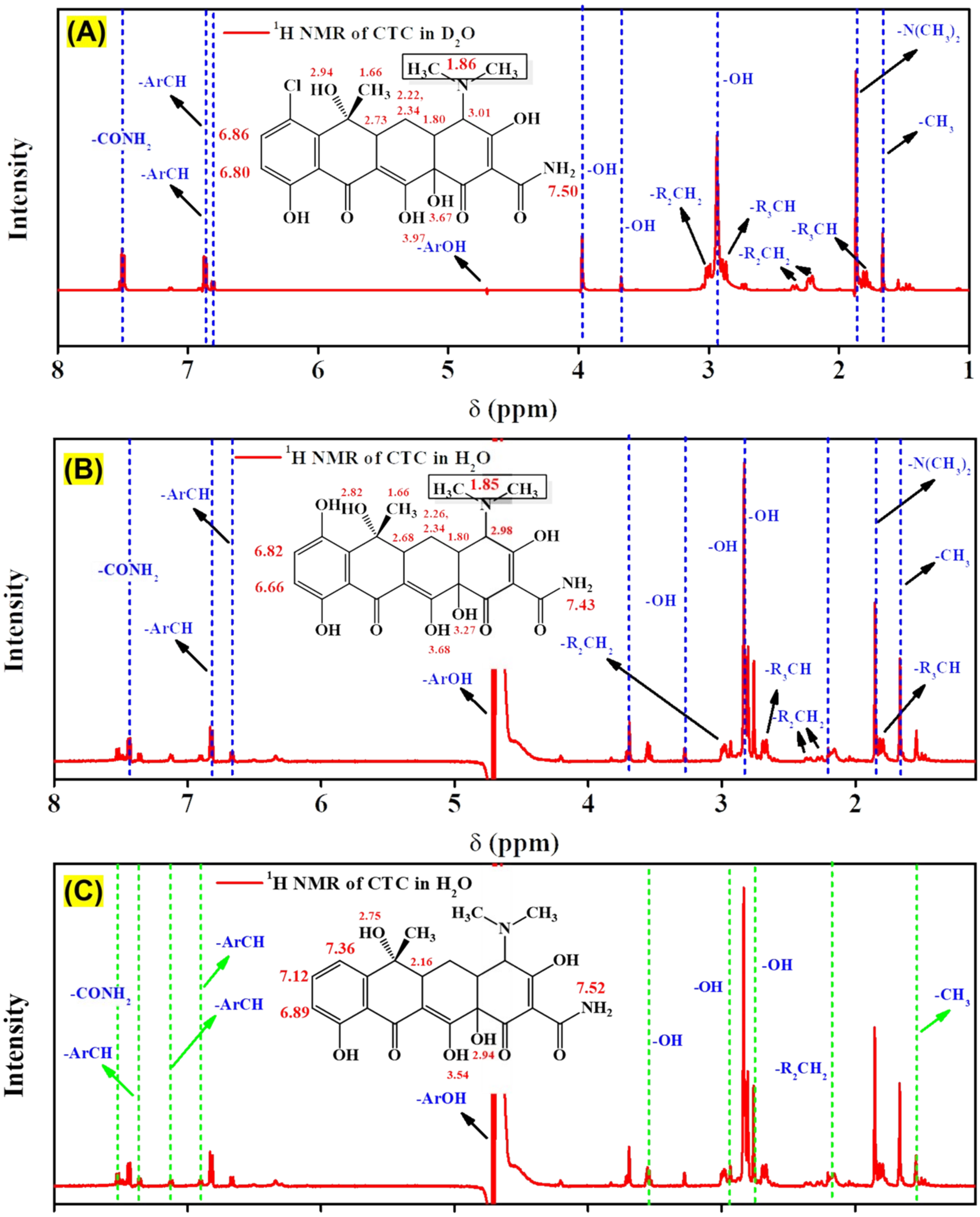

Fig. S3 [1]H NMR spectroscopy of CTC in the presence of D_2O and alkaline medium.

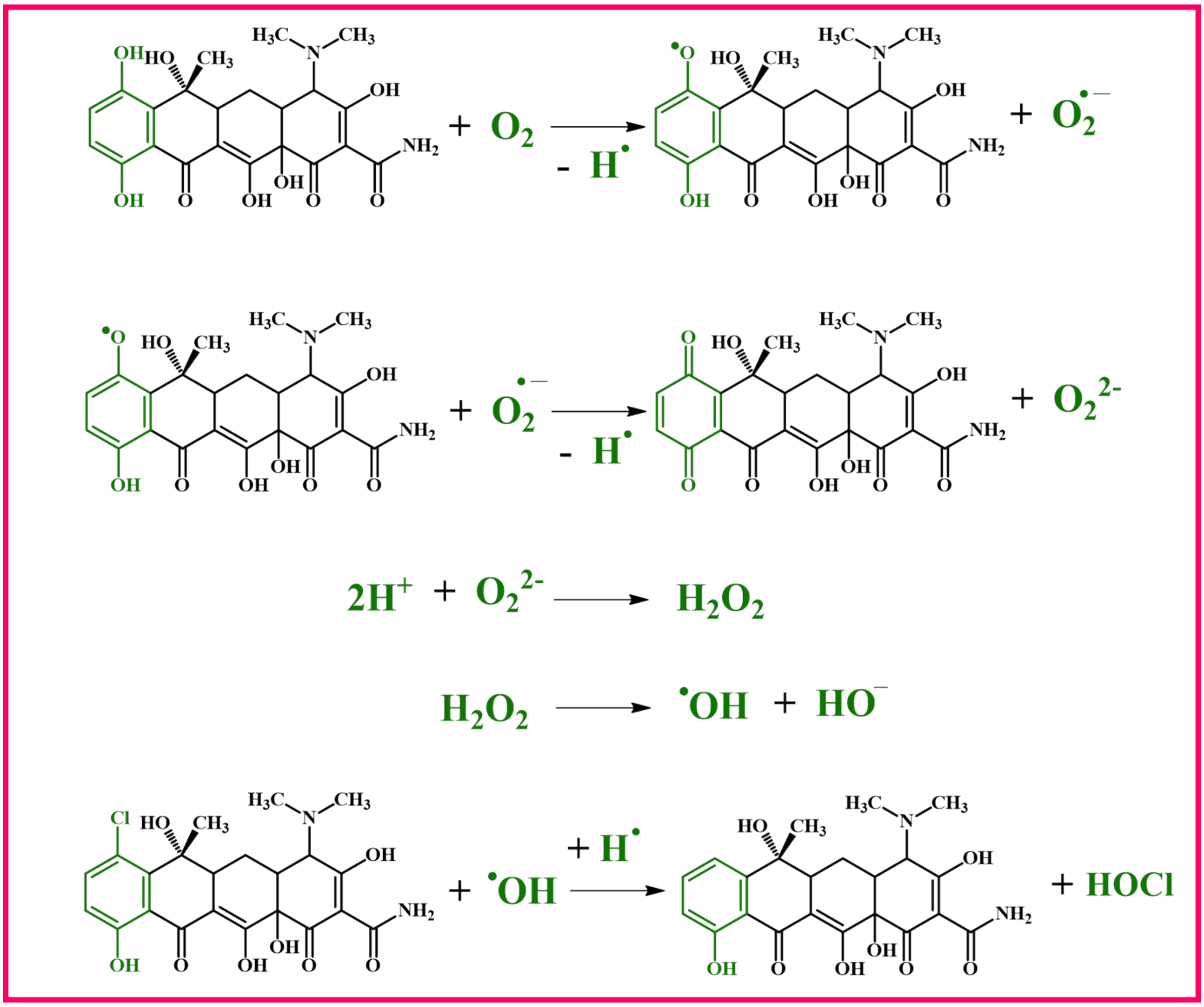

Fig. S4 Possible Mechanism for the formation of TC from CTC

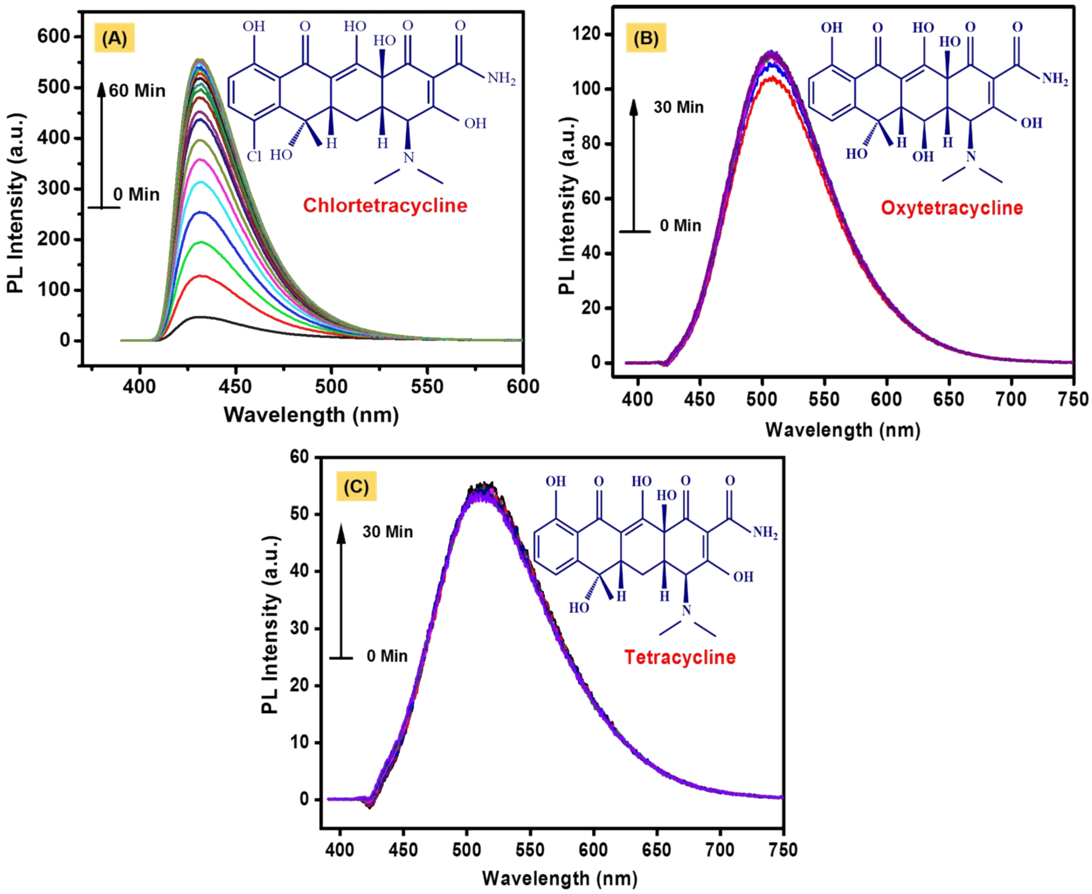

Fig. S5 PL emission spectrum of (A) CTC, (B) OTC, and (C) TC in the presence of MoS_2 at various incubation times at alkaline pH 9.

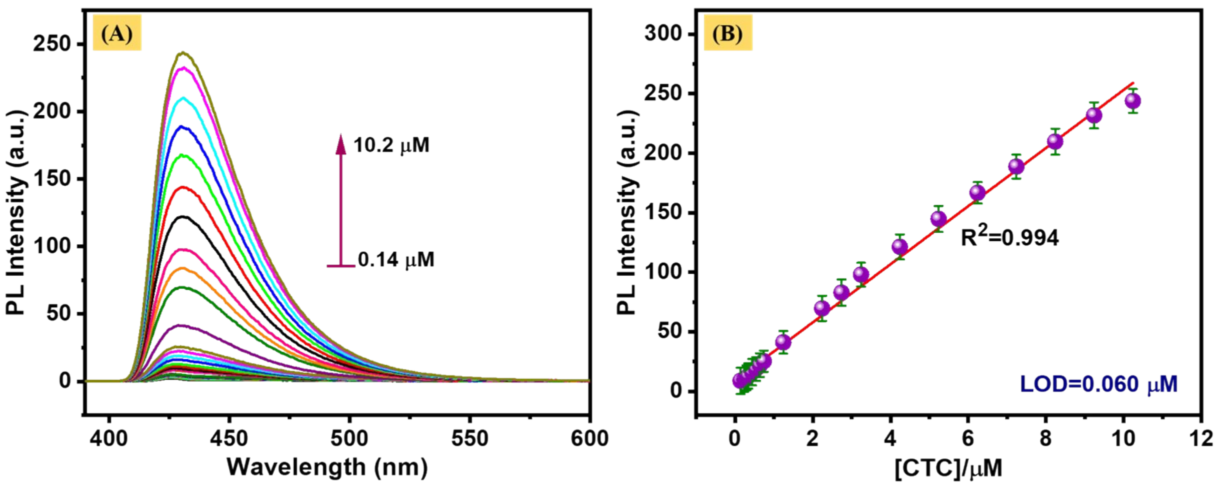

Fig. S6 (A) Concentration studies of CTC at various concentrations from 140 nM to 10.2 μM (B) Linear correlation plot between PL emission intensity vs. CTC concentration.

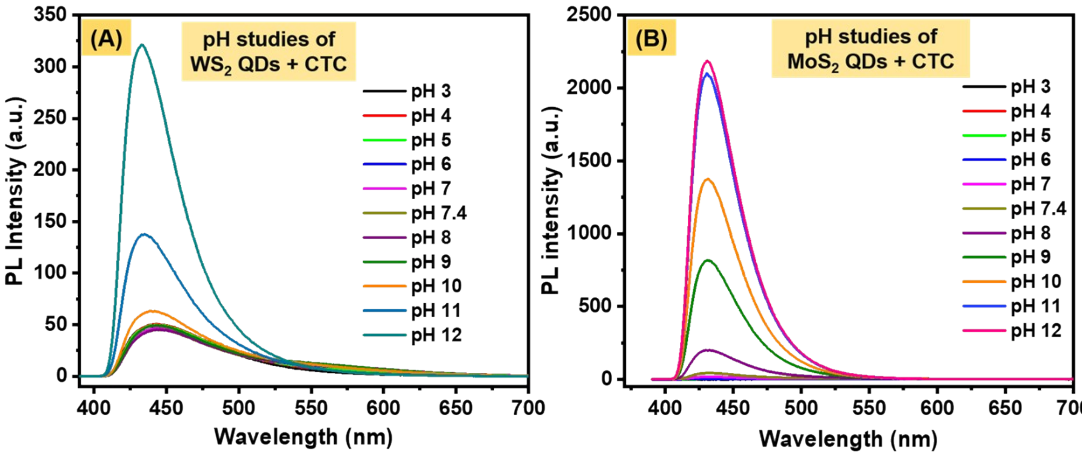

Fig. S7 (A)PL emission spectrum of synthesized WS_2 QDs & MoS_2 QDs in presence of 10 µM CTC at various pH (pH 3 - pH 12).

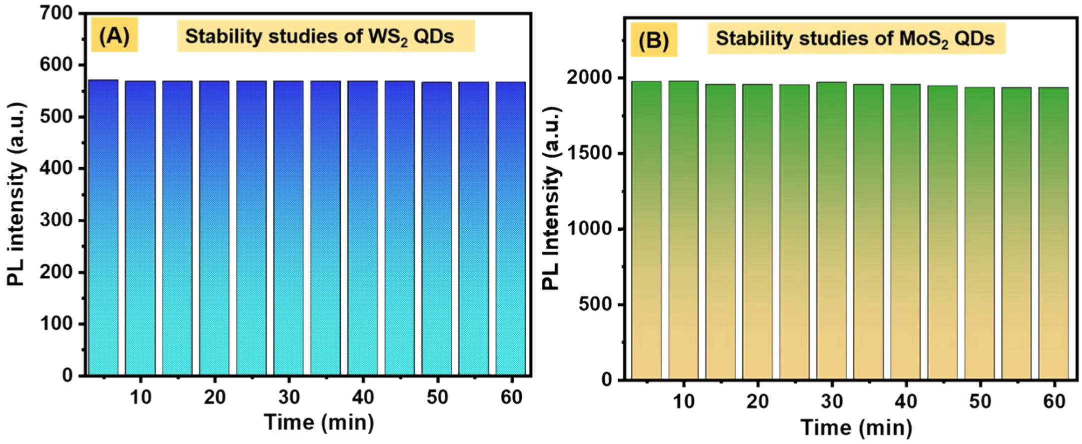

Fig. S8 Stability studies of WS_2 QDs (A) & MoS_2 QDs (B) in the presence of 10 µM CTC.

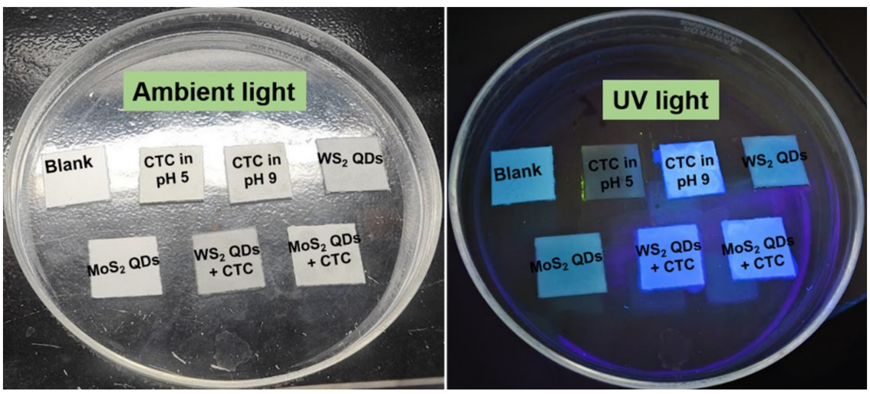

Fig. S9 Visual demonstration of the anti-counterfeiting capability of CTC, WS_2 and MoS_2 QDs.

Table. S1 Comparison of different fluorophores for CTC detection

S. No	Material	Fluorescence Detection mode	Linear range (µM)	LOD (µM)	Reference
1	Zn-BTEC	Turn-on	0 - 8	0.028	[1]
2	TSA/BSA-Au/AgNCs	Turn-off	0.33 - 60	0.071	[2]
3	Au/Pt NCs	Turn-on	0.5 - 10	0.35	[3]
4	CuNC-Al^{3+}	Turn-on	0.1 - 3	0.025	[4]
5	TP-CQDs	Turn-off	0.5 - 60	0.025	[5]
6	Cu NCs@TA	Turn-off	0.5 - 200	0.084	[6]
7	L-tryptophan	Turn-off	0.65 - 30	0.2	[7]
8	GST- Cu NCs	Turn-on	30 - 120	0.069	[8]
9	CPDs	Turn-on	0.1 - 120	0.04	[9]
10	Cu NCs@His	Turn-off	0.5-200	0.876	[10]
11	NCDs	Turn-off	5-100	0.254	[11]
12	WS_2 QDs	Turn on	0.15 - 13	0.035	This work
13	MoS_2 QDs	Turn-on	0.8 - 10	0.019	This work

BTEC - Pyromellitic acid, TSA - Thiosalicylic acid, BSA - Bovine serum albumin, TP-CQDs – Two-photon carbon quantum dots, TA - Tannic acid, GST - Glutathione S-transferase, CPDs – Carbonized polymer dots, His – Histidine, NCDs – Nitrogen-doped carbon dots.

Table. S2 Recovery test of spiked CTC in various real samples.

S. No	Samples	Spiked (µM)	Found (µM)	Recovery (%)	RSD (%)
		WS_2 QDs			
1	Water	1	1.02	102.80	3.78
		3	3.05	101.20	2.63
		5	4.96	99.20	1.34

2	Poultry soil extract	1 3 5	0.96 2.96 4.98	96.00 98.60 99.60	4.07 3.17 0.98
3	Milk extract	1 3 5	1.03 3.04 5.03	103.00 101.30 100.60	2.36 2.72 2.08
4	Chicken meat extract	1 3 5	1.01 3.06 5.06	101 102.1 101.2	3.81 2.97 3.32
			MoS_2 QDs		
1	Water	5 10 15	4.96 9.95 14.91	99.2 99.5 99.4	1.96 1.23 2.17
2	Soil extract	5 10 15	4.90 9.93 14.93	98 99.3 99.5	3.36 2.06 3.12
3	Milk extract	5 10 15	4.89 9.98 14.88	97.8 99.8 99.2	3.62 2.24 2.11
4	Chicken meat extract	5 10 15	5 9.93 15.05	100 99.3 100.3	1.09 2.62 2.52

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