Supporting Information

Direct growth of nitrogen-doped carbon quantum dots (NCQDs) on Co_9S_8 passivated on cotton fabric as an efficient photoelectrode for water treatment.

Kinza Shahid[a], Mubark Alshareef[b], Mumtaz Ali[c], Muhammad Imran Yousaf[a]*, Marwah M. Alsowayigh[d], Imtiaz afzal khan[e]

[a]Department of Applied Sciences, National Textile University, Faisalabad Pakistan

[b]Department of Chemistry, Faculty of Applied Science, Umm Al Qura University, Makkah 24230, Saudi Arabia

[c]Department of Textile Engineering, National Textile University, Faisalabad Pakistan

[d]Chemistry Department, College of Science, King Faisal University, P.O. 380, Al-Ahsa 31982, Kingdom of Saudia Arabia

[e]Department of Civil and Environmental Engineering, Hanyang University, 222 Wangsimni-ro, Seongdong-gu, Seoul, 04763, Republic of Korea

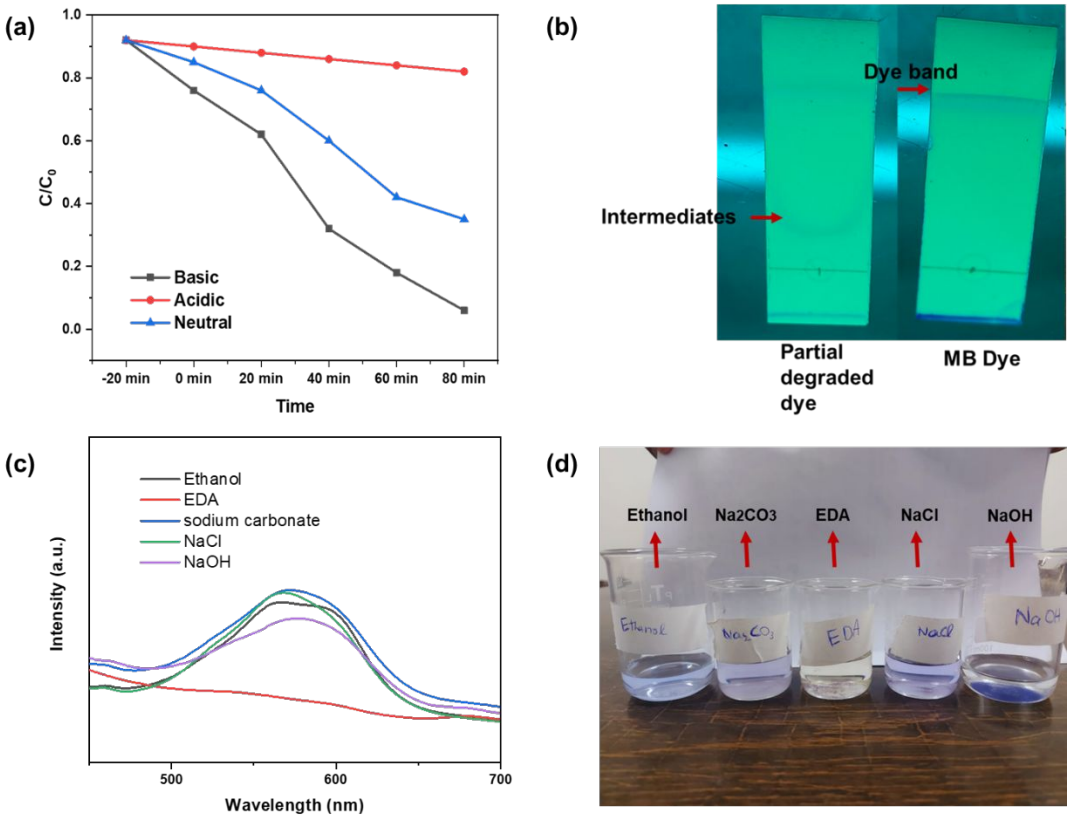

Figure S1. (a) The effect of solution pH on the degradation kinetics graph. (b) TLC plates with MB dye solution and partially degraded dye solution. (c) UV-visible absorption of NCQDs-G@Co_9S_8 (d) Degraded solution of MB dye with the addition of scavengers.

In recent studies, the reaction materials used are in powder form whereas the material used in our work is in the passivated form. The photodegradation efficiency of these papers are comparable even though, our material is not in powder form and its efficiency is significantly better than other papers as compared in Table S1.

Table S1. Comparison of dye degradation using different photocatalysts

Dye	Material	Phase	Efficiency	Time	Method	Reference
MB	MnTiO3	Mobile phase	70%	240 min	Sol-gel	[10]
MB	ZnO	Mobile phase	81%, 92.5%	3 hr	Precipitation, Sol-gel	[11]

MB	TiO2/rGO	Mobile phase	92%	120 min	Hummer's method	[12]
MB	Hybrid kaolin/TiO_2	Mobile phase	90%	270 min	Wet precipitation method	[13]
MB	N-doped TiO2 PNIPAM-co-PAA microgels	Mobile phase	95%	150 min	Sol-gel method	[14]
MB	TiO2-zeolites	Mobile phase	96%	180 min	Liquid impregnation method	[15]
MB	PVDF/GO/ZnO	Mobile phase	86 %	180 min	Immersion-precipitation phase transformation	[16]
MB	Graphene oxide/poly (vinyl alcohol)/TiO2 microspheres TiO2 v	Mobile phase	95 %	180 min	One-pot synthesis	[17]
MB	Cobalt sulphide/NCQDS	Passivated phase	92%	80 min	Growth on fabric by hydrothermal method	

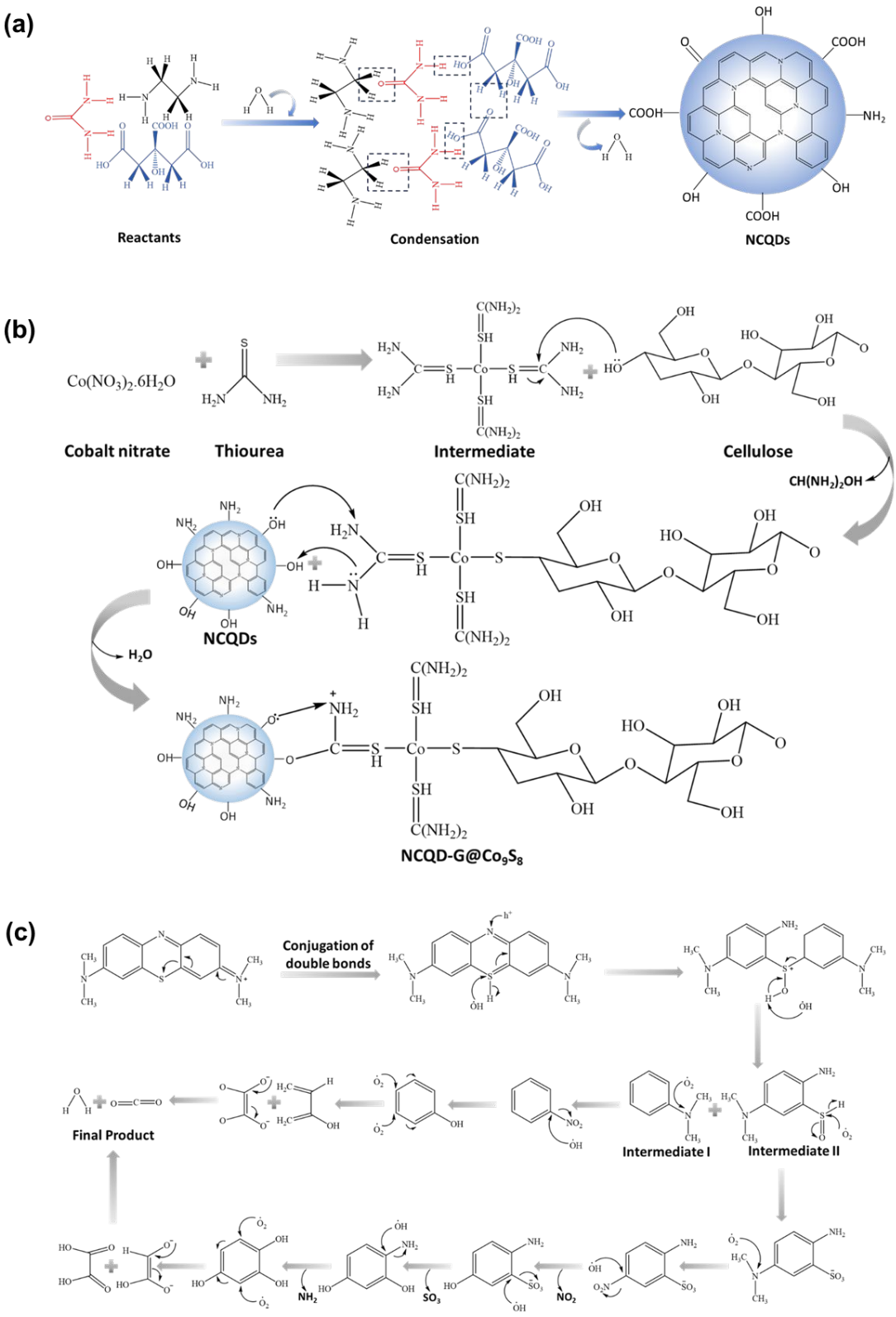

Figure S2. (a) structure of NCQDs. (b) Methodology of Co_9S_8 growth on cotton fabric and growth of NCQDs. (c) The proposed photocatalytic degradation mechanism MB Dye.