Supporting Information

Nanoarchitectonics of $CdFe_2O_4$ nanoparticles with different morphologies using thermal decomposition approach and studies on their peroxidase-like activity

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Figures and Tables:

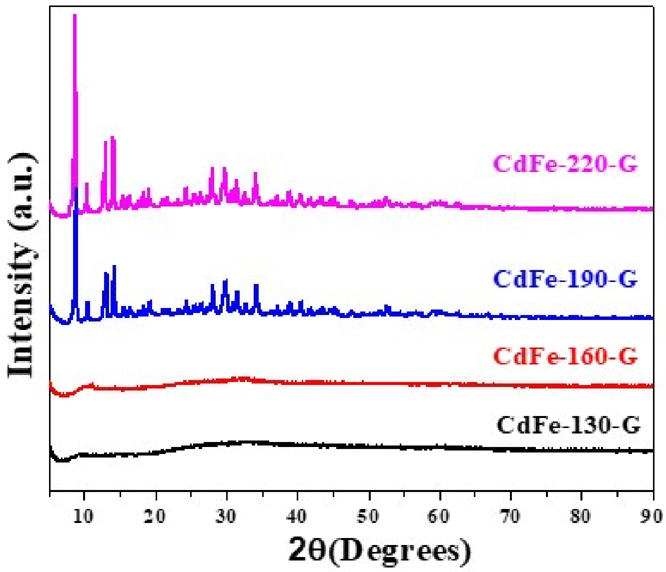


Figure S1. XRD patterns of Cd-Fe glycolates synthesized at different temperatures.

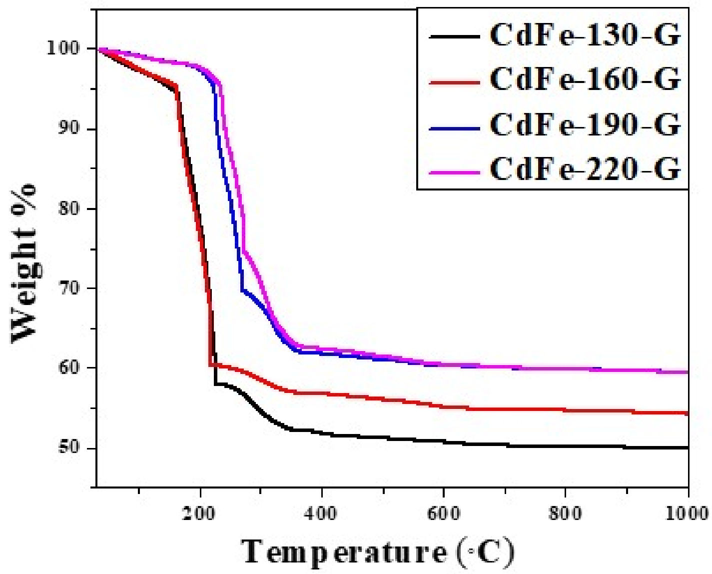


Figure S2. TGA curves of Cd-Fe glycolates synthesized at different temperatures.

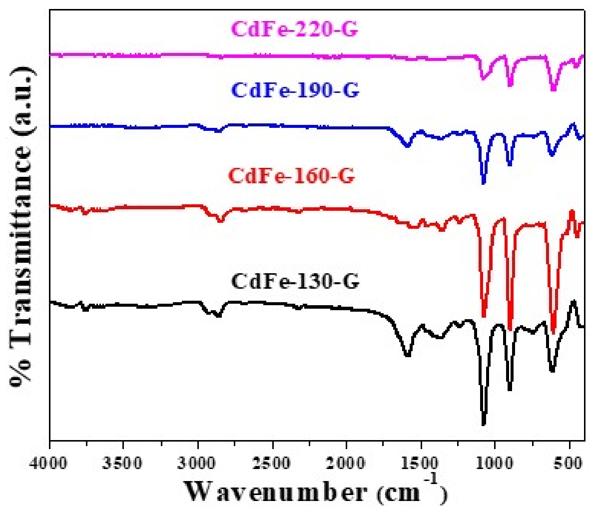


Figure S3. FT-IR spectra of Cd-Fe glycolates synthesized at different temperatures.

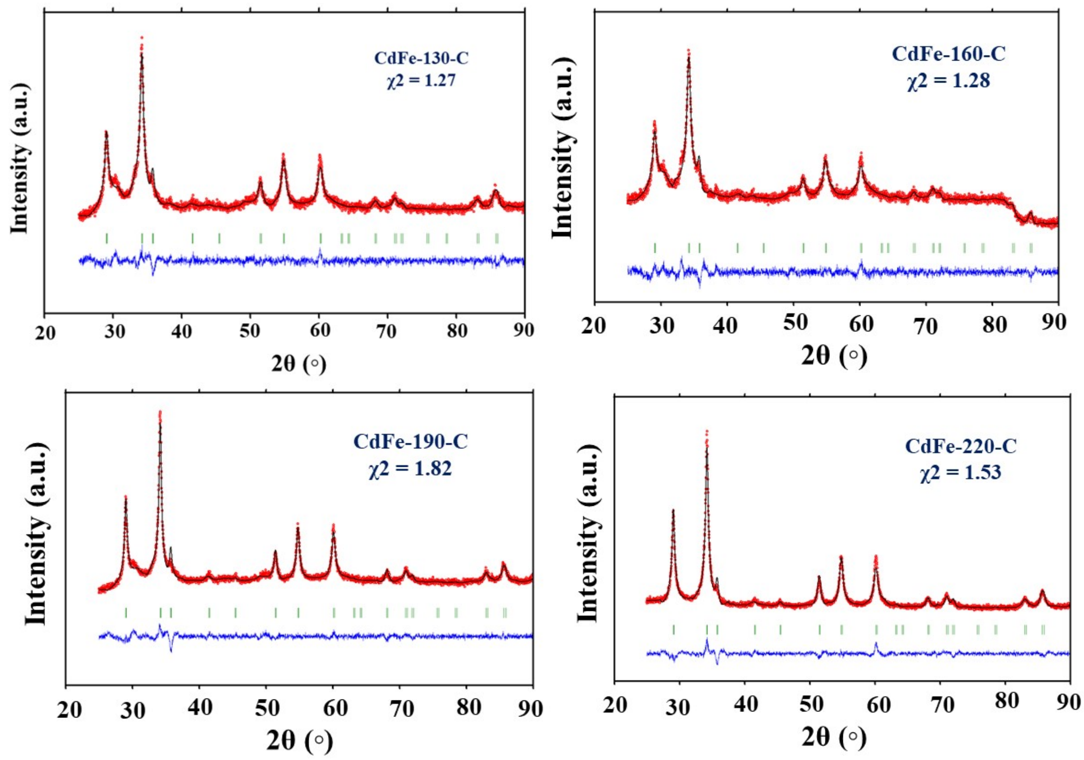


Figure S4. Rietveld refinement fits of powder XRD data for $CdFe_2O_4$ nanoparticles. The solid black line, green colored ticks and the blue line represent best fits to XRD data, position of Bragg peaks and the difference between refined and experimental data, respectively.

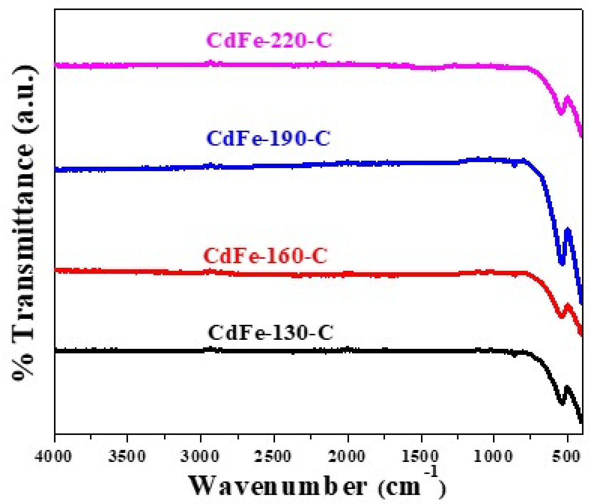
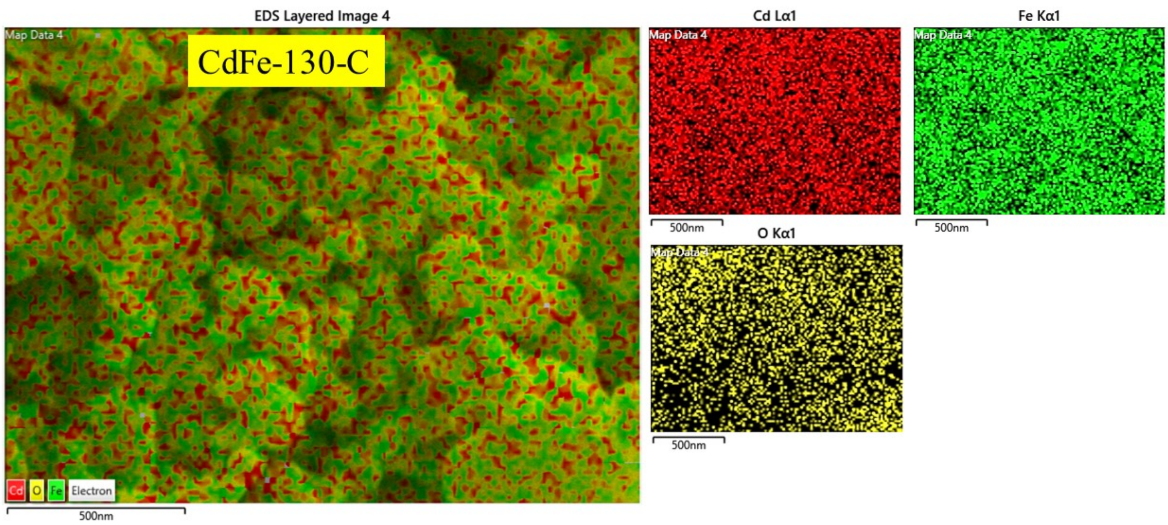
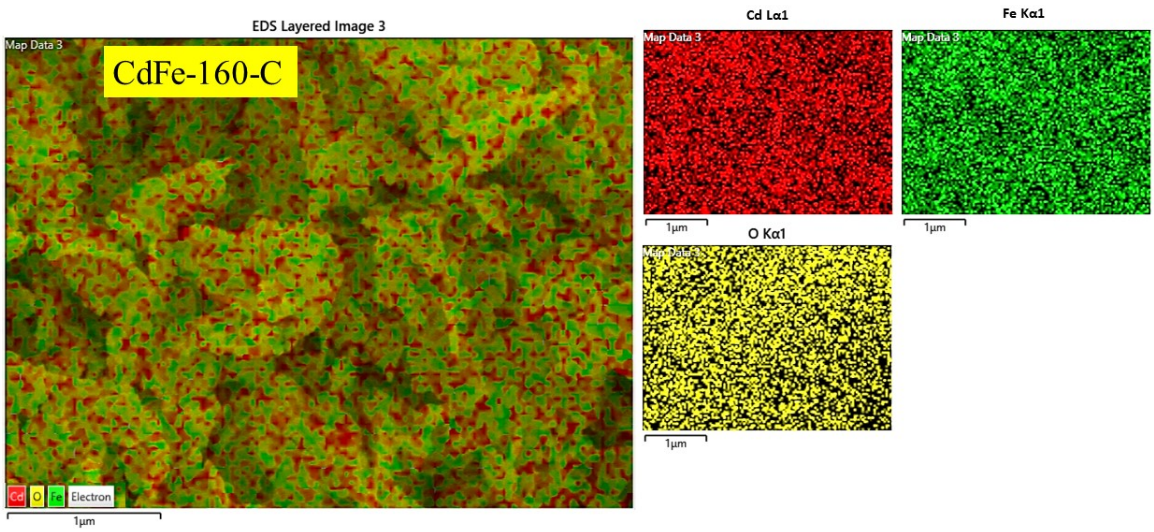


Figure S5. FT-IR spectra of $CdFe_2O_4$ nanoparticles obtained on calcination of Cd-Fe glycolates at 500 °C.





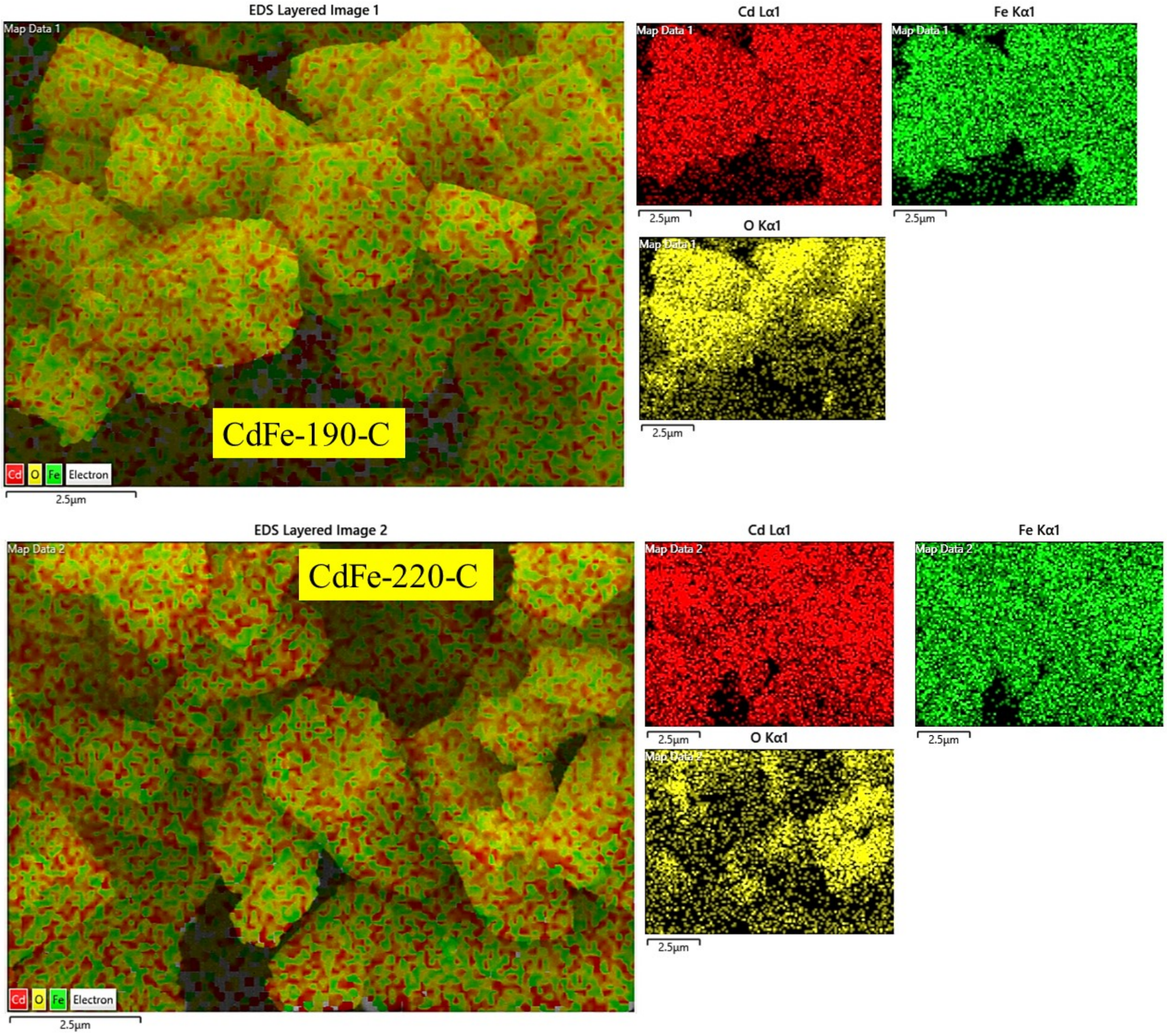


Figure S6. Elemental mapping of $CdFe_2O_4$ nanoparticles.

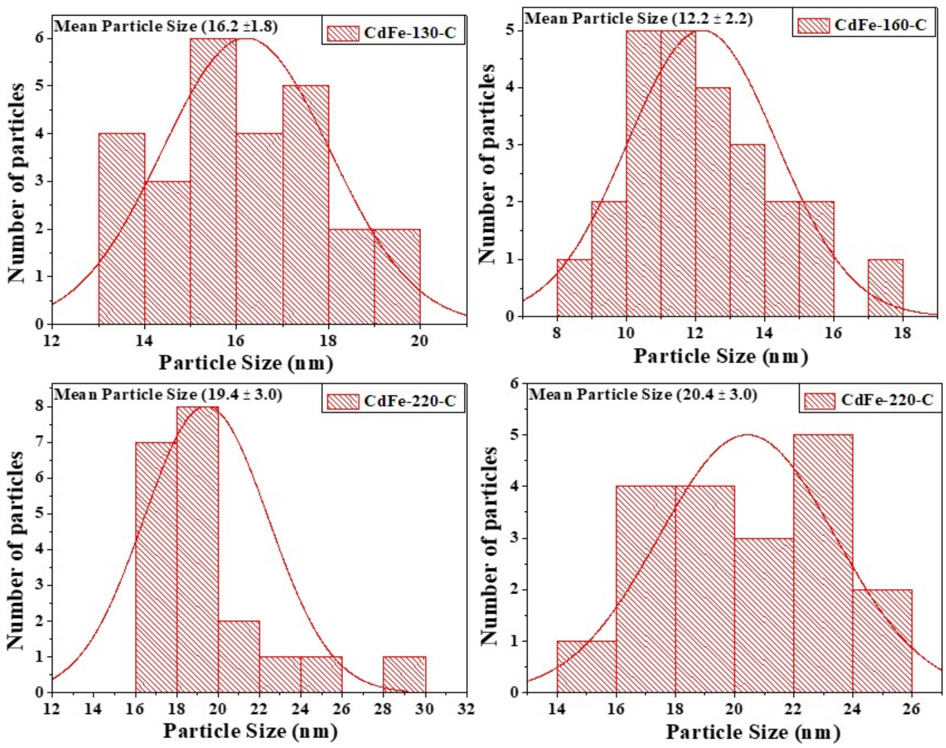


Figure S7. Particle size histograms of $CdFe_2O_4$ nanoparticles.

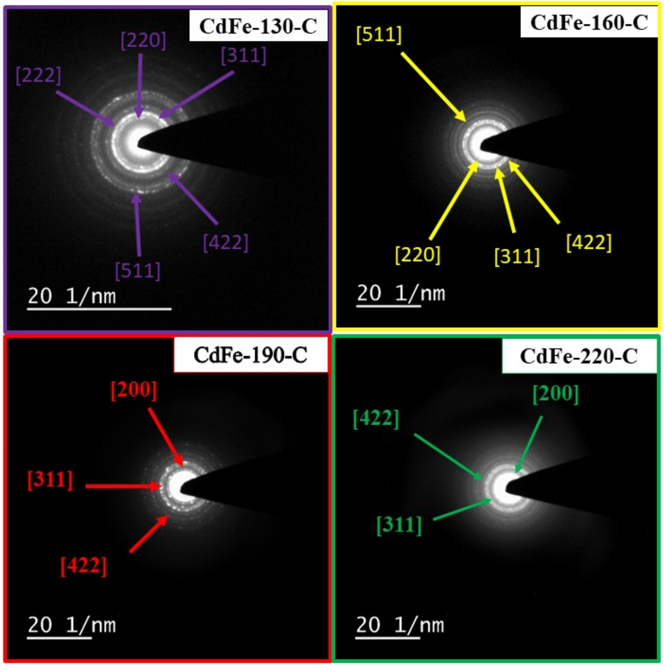


Figure S8. SAED patterns of $CdFe_2O_4$ nanoparticles.

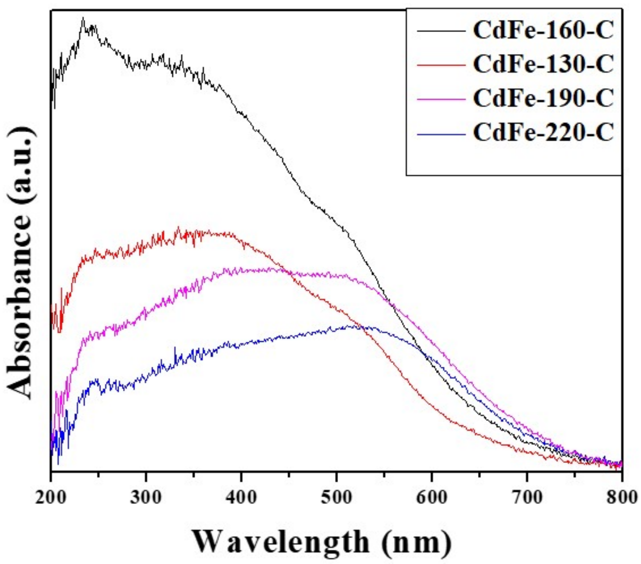


Figure S9. DRS spectra of $CdFe_2O_4$ nanoparticles.

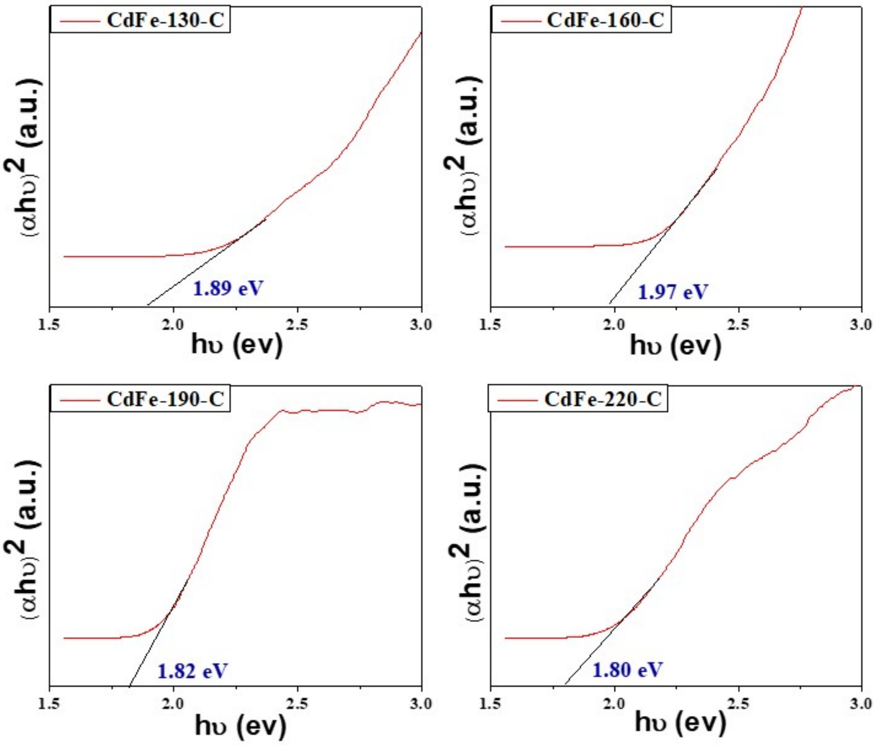


Figure S10. Tauc plots of $CdFe_2O_4$ nanoparticles.

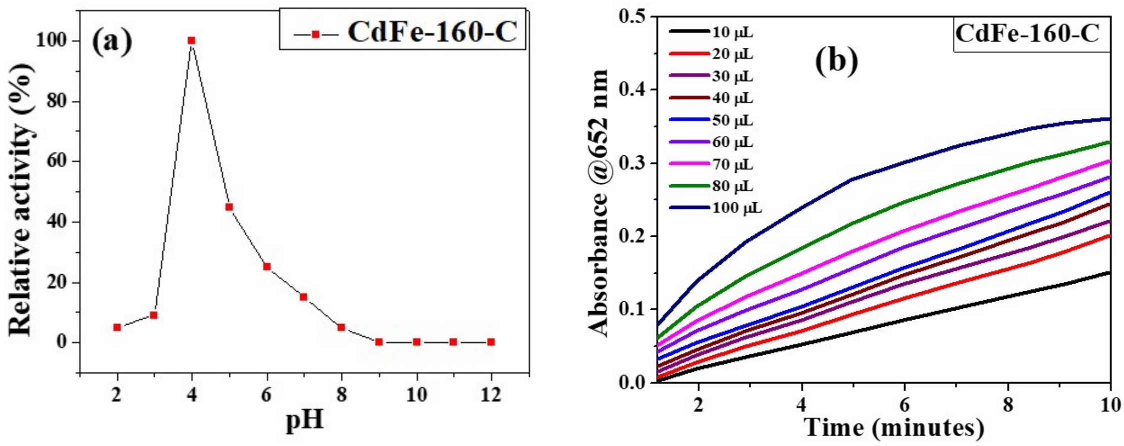


Figure S11. Effect of experimental conditions on peroxidase-like activity of $CdFe_2O_4$ nanoparticles (CdFe-160-C); (a) pH and (b) amount of catalyst dispersion.

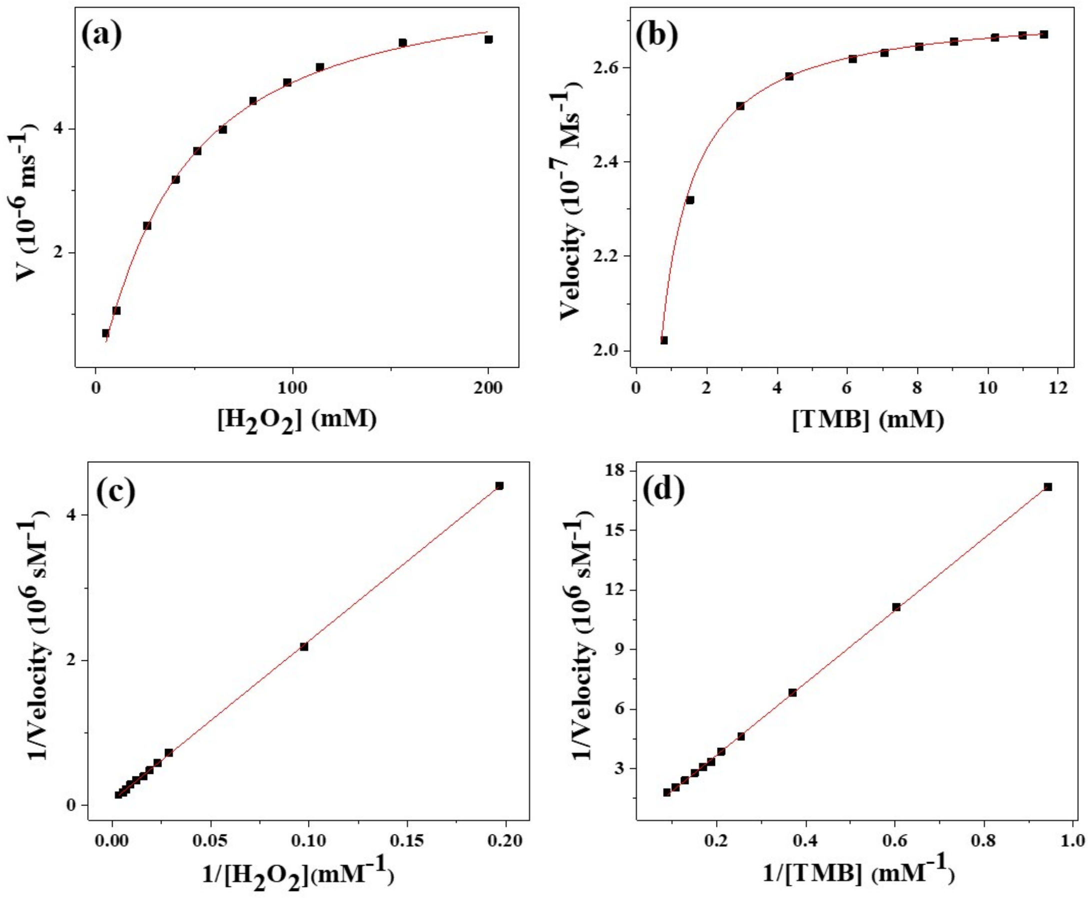


Figure S12: Steady-state kinetics results (a,b) and Lineweaver-Burk double reciprocal plots (c,d) of CdFe2O4 nanoparticles (CdFe-160-C) using different substrates H_2O_2 and TMB during the peroxidase-like activity studies.

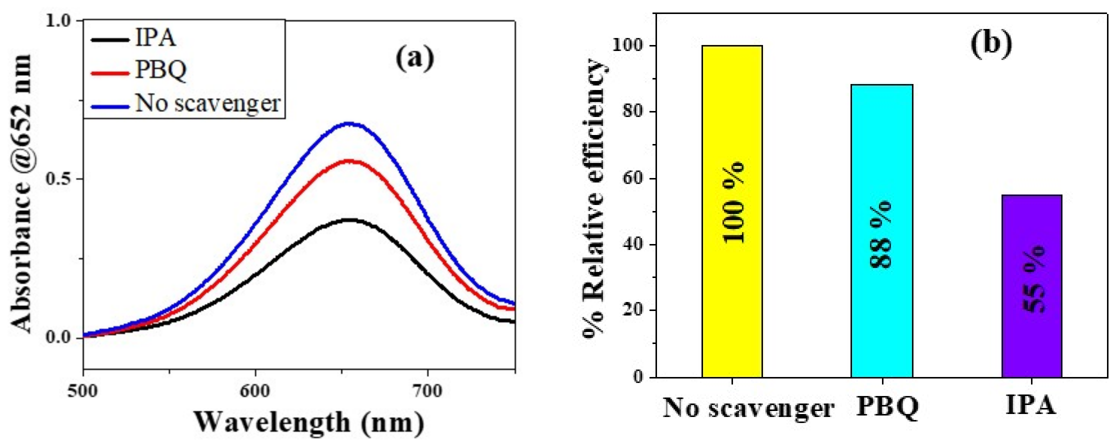


Figure S13: (a) UV-Vis spectra showing the effect of scavenger (IPA and PBQ) on the peroxidase-like activity of $CdFe_2O_4$ nanoparticles (CdFe-160-C) and (b) variation of peroxidase-like activity with different scavengers.

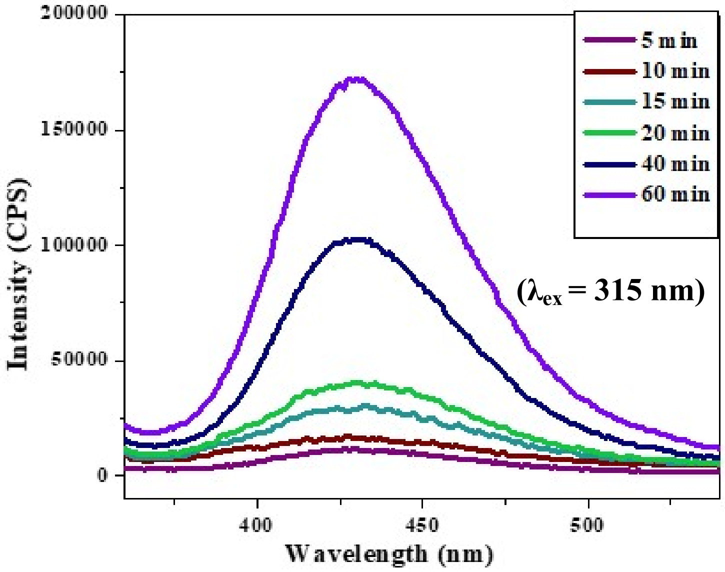


Figure S14. Fluorescence spectra indicating the formation of hydroxyl radicals during the catalytic oxidation of TMB by CdFe-160-C nanoparticles.

Table S1. Summary on TGA results of Cd-Fe glycolates prepared using different synthesis temperatures.

Sample code	Loss of physisorbed water and ethylene glycol molecules		Decomposition of organic moieties		Oxidation of dehydrated Cd-Fe glycolate		Overall weight loss (%)
	Temp. (°C)	% Wt. loss	Temp. (°C)	% Wt. loss	Temp. (°C)	% Wt. loss	
CdFe-130-G	30-162	5.5	162-226	40.2	226-340	5.6	51.3
CdFe-160-G	30-159	5.2	159-217	35.0	271-349	3.5	43.7
CdFe-190-G	30-219	4.1	219-269	25.0	269-354	8.5	37.6
CdFe-220-G	30-230	4.3	230-272	19.3	272-352	13.0	36.6

Table S2: Summary of IR bands observed in Cd-Fe glycolates along with their assignment.

CdFe-130-G	CdFe-160-G	CdFe-190-G	CdFe-220-G	Assignment
2925, 2864	2917, 2840	2932, 2858	2845	$\nu_{(CH2)}$ (asym.), $\nu_{(CH2)}$ (sym.)
1581	1549	1592	-	$\nu_{(C=O)}$
1459	1453	-	-	$\delta_{(C-OH)}$
1378	1357	-	-	$\omega_{(CH2)}$
1235	1232	1239	1239	$\nu_{(C-C-O)}$
1071	1068	1071	1069	$\nu_{(C-C)}$
898	894	894	899	$\nu_{(C-O)}$
614	605	615	612	$\nu_{(M-O)}$ T_d
421	442	429	452	$\nu_{(M-O)}$ O_h

Table S3: EDX analysis results for Cd-Fe glycolates. The analysis was done at three different spots for each sample.

Sample code	Cd		Fe		Comment
	At. %	Wt. %	At.%	Wt.%	
CdFe-130-G	12.20	25.16	24.32	50.88	Uniform
	13.34	25.24	25.46	49.96	
	12.28	25.30	24.61	48.93	
CdFe-160-G	13.43	25.09	26.19	50.90	Uniform
	14.52	25.23	28.50	50.32	
	13.22	24.42	28.67	49.52	
CdFe-190-G	14.28	20.54	30.40	40.35	Uniform
	15.25	21.13	30.35	42.32	
	15.30	21.50	30.43	42.42	
CdFe-220-G	16.60	27.20	32.11	53.92	Uniform
	16.52	26.10	32.30	54.26	
	15.41	26.35	30.40	54.44	

Table S4: EDX analysis results for $CdFe_2O_4$ NPs. For each sample, the analysis was done at three different spots.

Sample code	Cd		Fe		Comment
	At. %	Wt. %	At.%	Wt.%	
CdFe-130-C	15.30	22.56	28.30	43.88	Uniform
	16.30	22.14	27.45	43.96	
	15.28	21.90	28.60	43.93	
CdFe-160-C	15.41	27.09	31.19	54.92	Uniform
	15.51	26.23	30.50	54.30	
	15.26	25.42	32.67	53.50	
CdFe-190-C	15.30	22.56	28.44	43.88	Uniform
	16.30	22.14	28.85	43.96	
	15.28	21.90	28.69	43.93	
CdFe-220-C	17.62	28.30	31.19	58.92	Uniform
	17.50	27.20	33.33	57.22	
	16.40	27.45	35.42	56.43	