Supporting Information for

Construction of High-performance g-C_3N_4-based Photo-Fenton Catalysts by Ferrate-induced Defect Engineering

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1. SEM morphology analysis

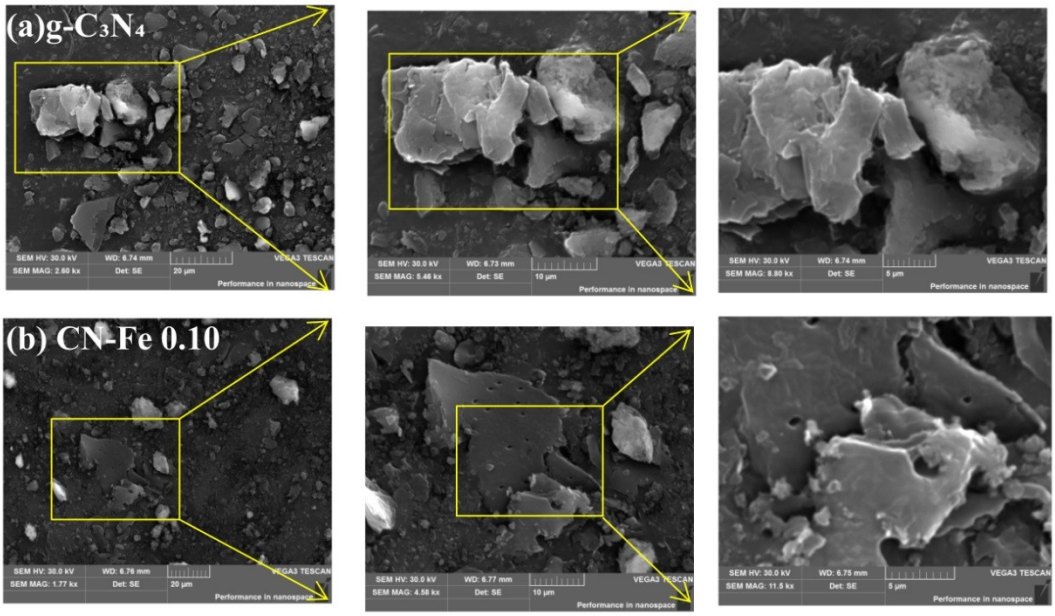

Figure S1 SEM images of (a) g-C_3N_4 and (b) CN-Fe 0.10

The morphology and microstructure of as-prepared g-C_3N_4 and CN-Fe 0.10 photocatalysts were further obtained by scanning electron microscopy (SEM). As depicted in Fig. S1a and b, all samples show a typical layered structure and maintains its planar structure. Surprisingly, compared with g-C_3N_4, which has a dense layer stacking and non-porous structure, a porous structure appeared on CN-Fe 0.10 nanometer sheet structure. This is probably due to the gases generated by the copolymerization between K_2FeO_4 and urea during the calcination process. Although the results of the characterized data show that the differences in specific surface area of different samples are relatively small, the porous structure appears, the unique structure could not only efficiently shorten the charge transfer distance but also provide more reactivity sites for a remarkable catalytic performance. The corresponding discussion has been added to pages 5 and supporting information.

2. Photo-Fenton performance of CN-Fe 0.10 at PH=3,7,9

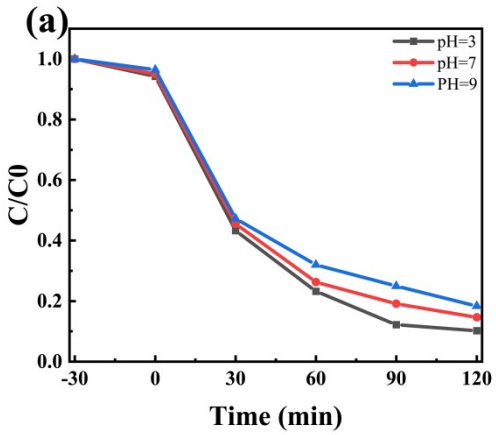

Fig. S2. Effect of solution pH on the photo-Fenton degradation performance of CN-Fe 0.10 under visible light irradiation

The effect of pH was further investigated to evaluate the adaptability of CN-Fe 0.10 for TC removal. Comparisons of degradation performance at different solution pH levels are shown in Fig. S2. As reported，OH^- could react with h^+ to generate ·OH and then oxidize pollutants under weakly acidic or alkaline conditions. However, iron hydroxide complexes could form on the surface of the catalyst when the pH increased to 9, which resulted in a slight decreased oxidization ability. The results demonstrated that the as-prepared CN-Fe 010 photocatalyst had excellent degradation performance under under different pH conditions. According to the previous preliminary experiment, the amount of catalyst is positively correlated with the degradation efficiency. However, due to the COVID-19 epidemic, the laboratory has been closed and the influence of catalyst dosage and H_2O_2 concentration cannot be further measured.

3. Element content comparaion

Table S1. The atomic percentages of C, N, O, K and Fe in g-C_3N_4 and CN-Fe 010

	C(at.%)	N(at.%)	O(at.%)	K(at.%)	Fe(at.%)
g-C_3N_4(XPS)	55.68	39.51	4.81	-	-
CN-Fe 0.10 (XPS)	55.53	37.18	5.43	1.31	0.55
CN-Fe 0.10 (ICP-MS)	-	-	-	2.23	0.87