Supplementary

1. As shown in Fig.S1, it is a schematic diagram of the process of CC-G-X material production.

2. Figure S2 (a-c) shows scanning electron microscopy of cuprous oxide soft template and CC (Selenide 100min, selenide 10min).

3. Fig. S3. (a) SEM image of CC-G-20；(b) EDS images of CC-G-20；

4. Table 3 shows the specific content of each element in CC-G-20 material.

5.

Methyl green (MG) and Rhodamine B (RhB) were selected under suitable conditions. The experiment was designed to find more possibilities for CC-G-20 degrading dyes (Figure A1 a-f).

Reaction conditions:

Light source: Xenon lamp.

10 mg of CC-G-20, 25 ml of 30-mg/L MB (0.1 ml of H_2O_2), 25 ml of 10-mg/L MG (0.3 ml of H_2O_2), 25 ml of 10-mg/L RhB (0.3 ml of H_2O_2).

Refer to Parts 2-4 of the manuscript for specific experimental operations.

6.

I had done experimental research on selecting the best combination of CuSe and g-C_3N_4. In order to make the synthetic material process more energy efficient, simple, economical. I did not choose hydrothermal, solvothermal or calcination options. The CC-G materials were prepared at a constant temperature (25 degrees Celsius). Subsequently, different experimental schemes were established (the proportion of CuSe and g-C3N4 in the following scheme is the same as that in the manuscript) :

6.1. The CuSe yolk shell is simply mixed with g-C_3N_4 by ultrasonic shock, agitation, and centrifugation (Called Sample 1).

Compared with the scheme in the manuscript, the degradation effect is not perfect. Figure A2 (a-c) shows the MB degradation results of this sample 1 compared with the CC-G-20.

6.2. During the preparation of Cu_2O, g-C_3N_4 was added (g-C_3N_4 was mixed with anhydrous copper sulfate solution, then add the NaOH drop by drop while stirring vigorously for about 25-30min. The remaining steps are the same as in section 2.2.2 of the manuscript). The sample named Cu_2O/g-C_3N_4 morphology after such treatment is shown in Figure A3. And then it was selenized (Called Sample 2). Figure A2 (a-c) shows the MB degradation results of the sample1, sample2 and CC-G-20. It can be seen that compared with the results in 1, the effect of simple 2 is similar at around 60min, but there is no significant improvement in the degradation effect between 60-120min.

Therefore, the experimental scheme in this manuscript was adopted to prepare CC-G.

The novelty is that g-C_3N_4 is treated in selenium ion solution and then participates in the selenization of Cu_2O. According to the results of Fig.A2, g-C_3N_4 needs to be hybridized in a reasonable place of CC material. Whether other excessive metallic chalcogenide compounds rational hybridize g-C_3N_4 by this method to improve the catalytic level, and it is also worth discussing how to make g-C_3N_4/Fenton catalytic materials obtain the most appropriate hybrid g-C_3N_4 way (the most effective degradation of dyes).

7.

The adsorption capacity of the material is not good. During the experiment, after 10 min ultrasonic shock (MB solution: 20mL, 30mg/L. Without this treatment, the materials will float on the surface of MB solution), then, it was vigorously stirred in the dark environment for 30min. It is observed that the color of the solution has no obvious change compared with the material with strong adsorption property. (Table 1).

8.

The MB degradation performance of CC-G-20 is comparable to that of other literatures. Literature with higher degradation efficiency is listed (Table 2).

9.

Auger spectrum of Cu was listed, regarding XPS spectra, Figure 3b has been re-analyzed (Fig. A4).

Fig. S1

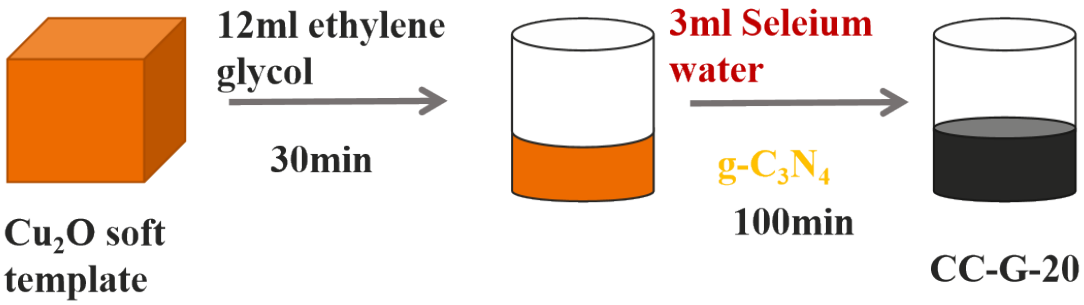


Fig. S2

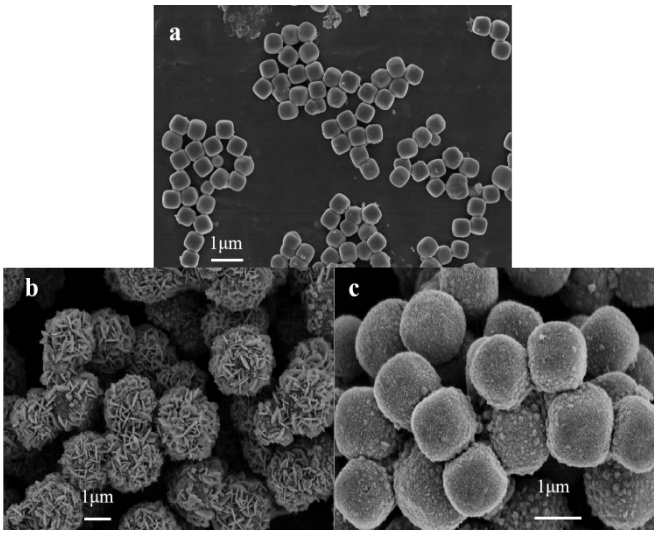
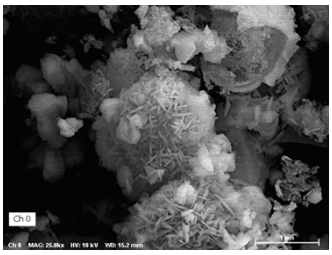
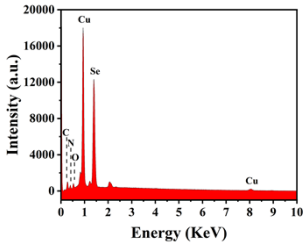


Fig. S3

a.



b.



The corresponding elemental analysis by energy dispersive spectroscopy (Fig. S3 b) indicates the presence of N.