**Highly efficient photocathodic protection performance of 2D/2D ZIS@CNNs composites under visible light**

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**Fig. S1.** Picture of CNNs and three different ZIS@CNNs composite material.



**Fig. S2.** Schematic diagrams of experimental setup for (a) OCP, EIS, Tafel (b) photocurrent densities tests.



**Fig. S3.** OCP-t curves of 304 SS coupled with CNNs and 30% ZIS@CNNs composite.

**Table S1** Comparison of 2D/2D ZIS@CNNs photoanode with other photoanodes.

|  |  |  |  |
| --- | --- | --- | --- |
| Samples | Metal | Photocurrent density | Ref |
| WO3/ZnWO4/ZnO | 316L SS | 8 μA·cm−2 | [1] |
| 1D-p-g-C3N4@RGO | 304 SS | 10 μA cm–2 | [2] |
| SrTiO3 | 304 SS | 9.2 μA cm–2 | [3] |
| C-vacancy g-C3N4/GO/WO3 | 304 SS | 16 μA cm–2 | [4] |
| g-C3N4/rGO/ZnS | 304 SS | 15 μA cm–2 | [5] |
| STO/g-CN | 304 SS | 8.2 μA·cm−2 | [6] |
| polyaniline/graphitic carbon nitride | Fe | 11 μA·cm−2 | [7] |
| g-C3N4/epoxy  | Q235 | 0.4 μA·cm−2 | [8] |
| 2D/2D ZIS@CNNs | 316 SS | 17 μA cm–2 | This work |

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