Supplementary Information

Facet-dependent photo-Fenton degradation of *p*-arsanilic acid and arsenic redistribution on hematite

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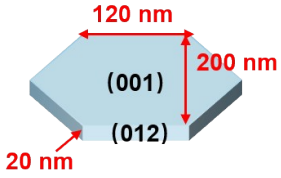
Fig. S1-S6 are included.

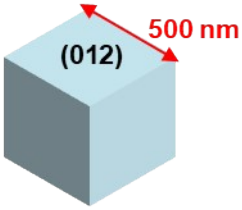
The surface area ratio of different facets in HNPs is calculated based on the regular hexagon shape and its geometric dimensions. The detail calculation formula is as follows:



$$\text{Ratio}(001) = \frac{2*S_{(001)}}{2*S_{(001)}+6*S_{(012)}} = \frac{2*(100*\frac{100}{\sqrt{3}}*2+120*200)}{2*(100*\frac{100}{\sqrt{3}}*2+120*200)+6*20*120)} = 83.2\%;$$

$$\text{Ratio}(012) = \frac{6*S_{(012)}}{2*S_{(001)}+6*S_{(012)}} = \frac{6*20*120}{2*(100*\frac{100}{\sqrt{3}}*2+120*200)+6*20*120)} = 16.8\%.$$

For HNCs, the nanocubes are enclosed entirely by six crystallographic planes belonging to the {012} family. Thus, the proportion of {012} facets is 100%.



Ratio(012) =100%.

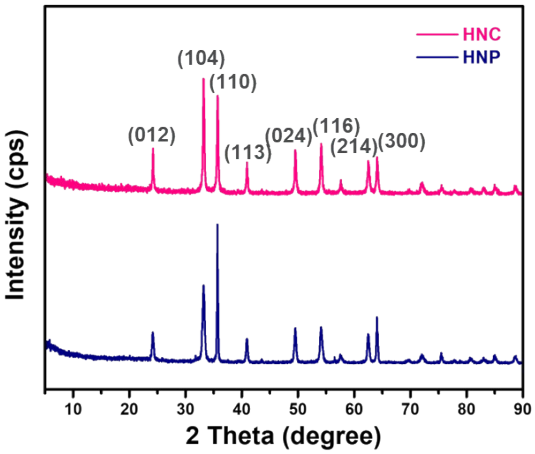


Fig. S1 XRD patterns of HNP and HNC.

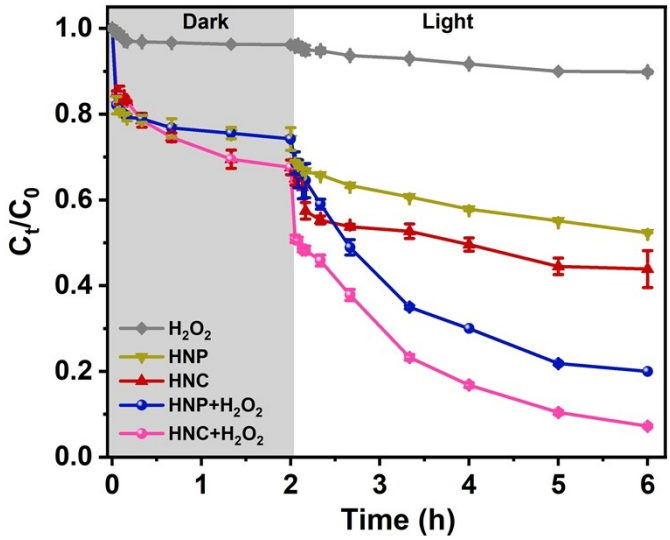


Fig. S2 Integrated performance of hematite in the dark adsorption and subsequent photocatalytic degradation of *p*-ASA.

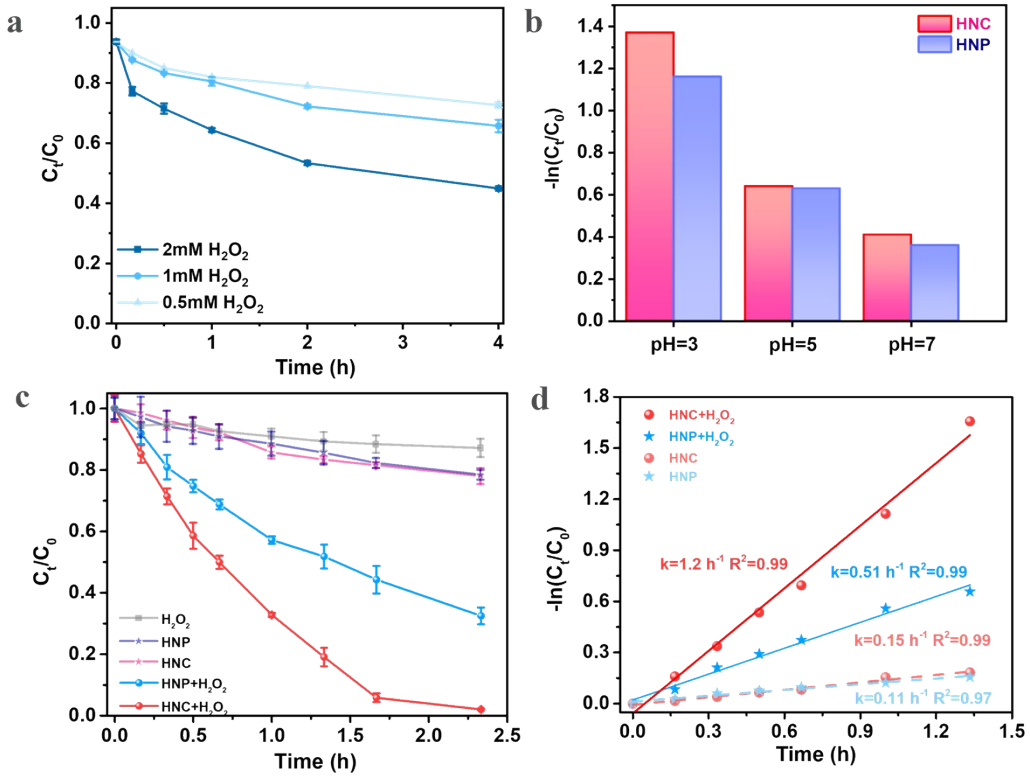


Fig. S3 Effects of reaction conditions on the photocatalytic degradation of *p*-ASA. (a) Degradation profiles at varying H_2O_2 concentrations. (b) Comparison of the apparent rate constants (*k*) under different pH conditions. (c) Temporal concentration change of *p*-ASA at pH=3. (d) Corresponding Langmuir-Hinshelwood pseudo-first-order kinetic fitting at pH=3.

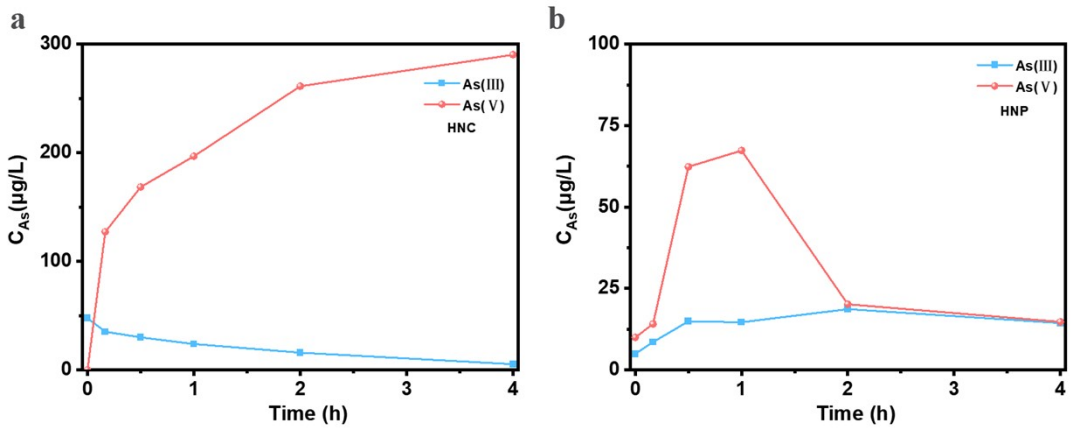


Fig. S4 Time-dependent concentrations of inorganic arsenic species (As(III) and As(V)) released during the photocatalytic degradation of *p*-ASA.

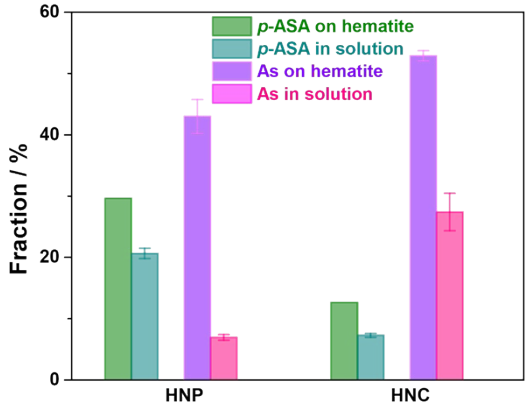


Fig. S5 Post-degradation distribution of arsenic species in the solid and liquid phases.

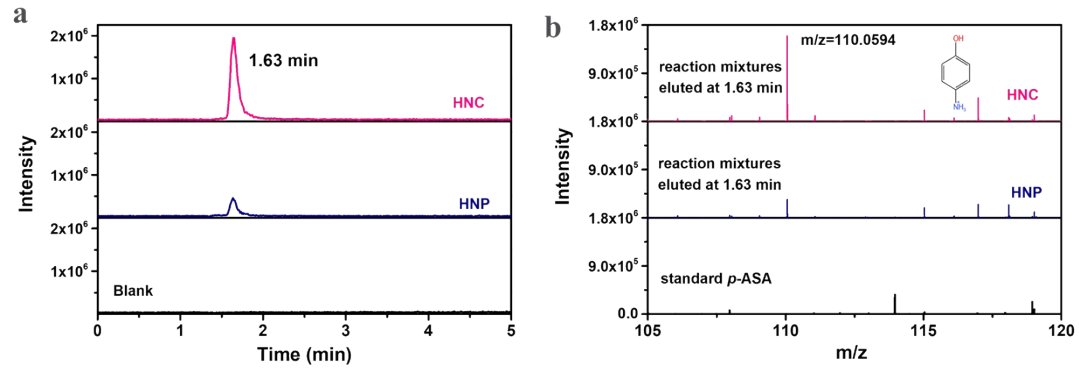


Fig. S6 Analysis of degradation intermediates. (a) HPLC-MS chromatogram of the reaction solution. (b) Mass spectrum of the intermediate eluting at 1.63 min, identified as *p*-aminophenol.