

## Supplementary information

### Ultrafine Pt nanoparticles anchored on core-shell structured zeolite-carbon for efficient catalysis of hydrogen generation

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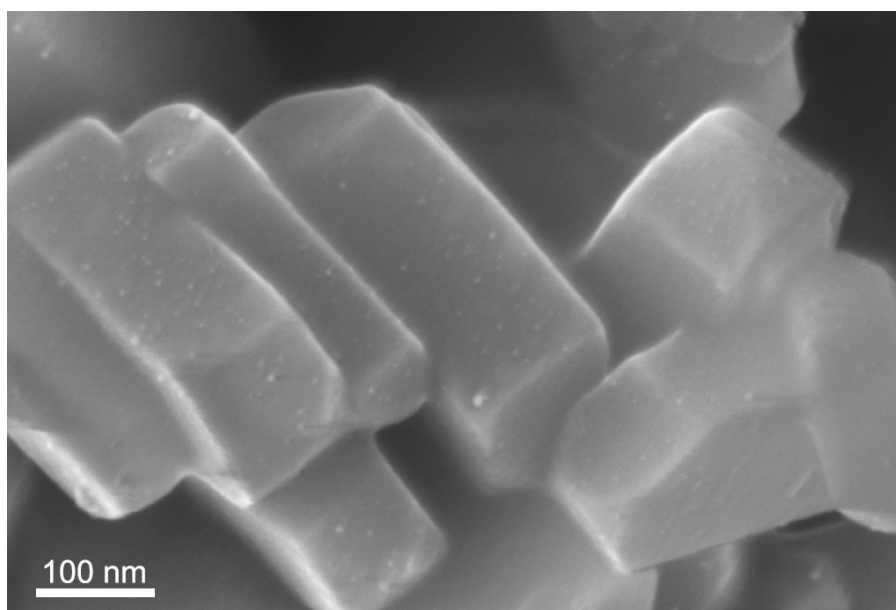
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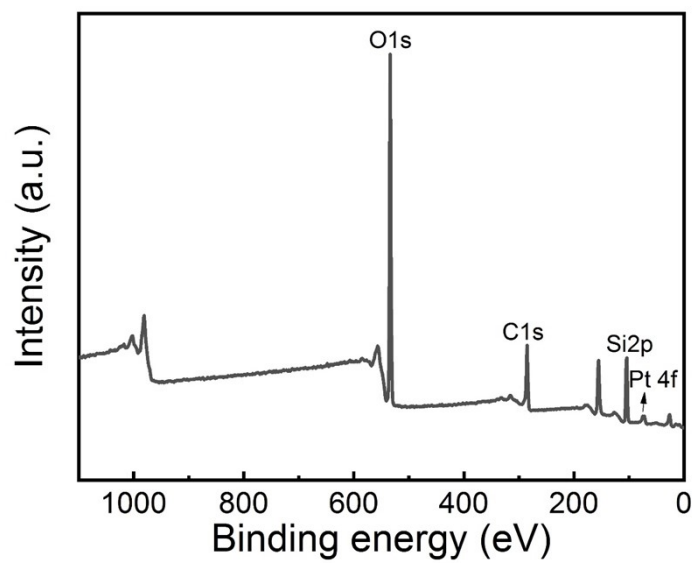
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## Experimental section

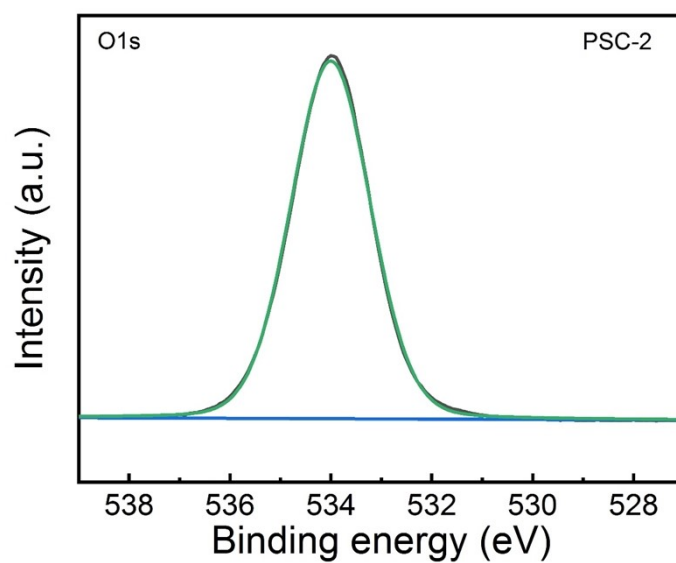
**Chemicals.** All chemical reagents were obtained commercially and used without further purification. All silicon molecular sieve (S-1), Chloroplatinic acid ( $\text{H}_2\text{PtCl}_6 \cdot 6\text{H}_2\text{O}$ , CSSC), sodium borohydride ( $\text{NaBH}_4$ , Kermel Co., Ltd., China,  $\geq 98.0\%$ ), ammonia borane ( $\text{NH}_3\text{BH}_3$ , Energy Chemical Co., Ltd., 98.0%), sodium hydroxide ( $\text{NaOH}$ , Sinopharm Chemical Reagent Co., Ltd., China,  $\geq 96\%$ ), glucose anhydrous ( $\text{C}_6\text{H}_{12}\text{O}_6$ , Tianjin Fengchuan Chemical Reagent Co., Ltd., China, AR).



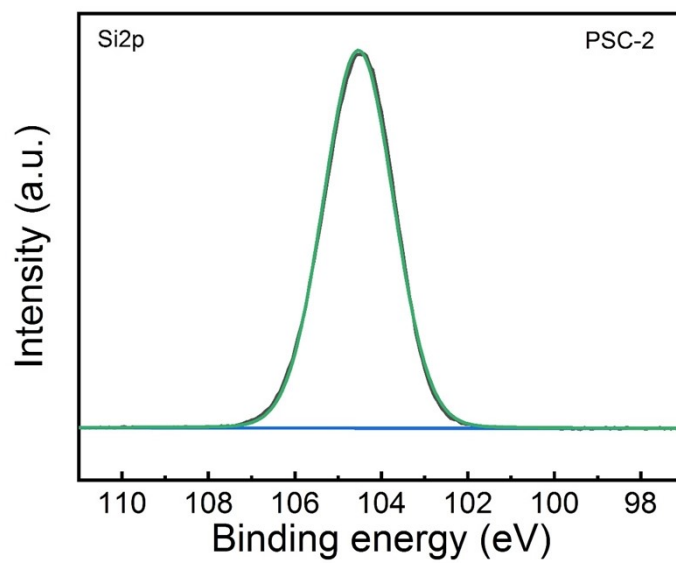
**Fig. S1.** SEM image of PSC-2.



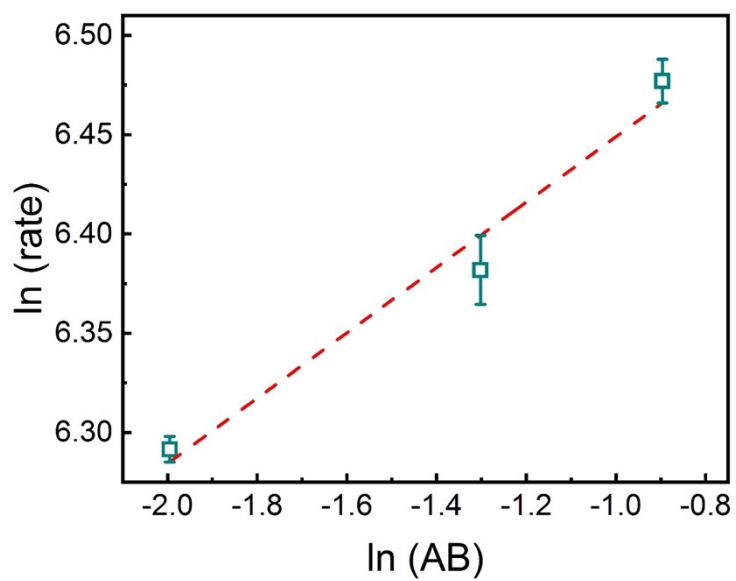
**Fig. S2.** XPS spectral image of RSC-2.



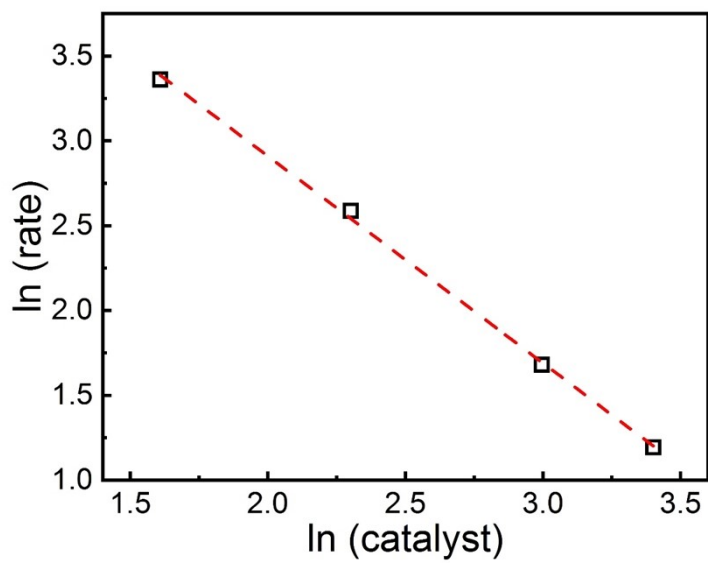
**Fig. S3.** XPS spectral image of O1s.



**Fig. S4.** XPS spectral image of Si2p.



**Fig. S5.** Fitting plot of catalytic rate under different AB concentration conditions.



**Fig. S6.** Fitting plot of catalytic rate under different catalyst dosage conditions.

**Table S1**

The integral area values of peaks D and G.

Peak	Peak area	FWHM	Peak height	Peak-weighted average center	Percentage of area
D	973943.3	208.8	4383.0	1381.7	54.9
G	800490.7	120.2	6258.3	1594.4	45.1

**Table S2**

Metal loading of each catalyst measured by ICP-OES.

Catalyst	Ru loading (wt%)
PSC-2	1.07

**Table S3**

The comparison of TOF and activation energies of various catalysts reported in the literature.

Catalysts	TOF (min <sup>-1</sup> )	<i>E<sub>a</sub></i> (kJ/mol)	References
Pt/S-1@C	593	44	This work
Pt@SiO <sub>2</sub>	159	54	1
Pt@h-mNSiO <sub>2</sub>	372	49	2
Pt-CeO <sub>2</sub> /rGO	94	65	3
Pt/CNT	100	52	4
Pt@PC-POPs	56	56	5
BOPs@Pt	131	44	6
Pt <sub>0.17</sub> Co <sub>0.83</sub> /PEI-GO	378	52	7
Pt <sub>0.01</sub> Ni <sub>0.99</sub>	42	49	8

Pt-Ru/PVP	308	56	9
Pt-Pd/PVP	125	52	10
Pt-CoCu@SiO <sub>2</sub>	273	51	11
Pt@Co/mCN	118	45	12

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