Supplementary Information for

Supramolecular Nanosheets Evolution into BC_3N Matrix Improves the Hydrogen Evolution Reaction Activity in pH-universal of Highly Dispersed Pt Nanoparticles

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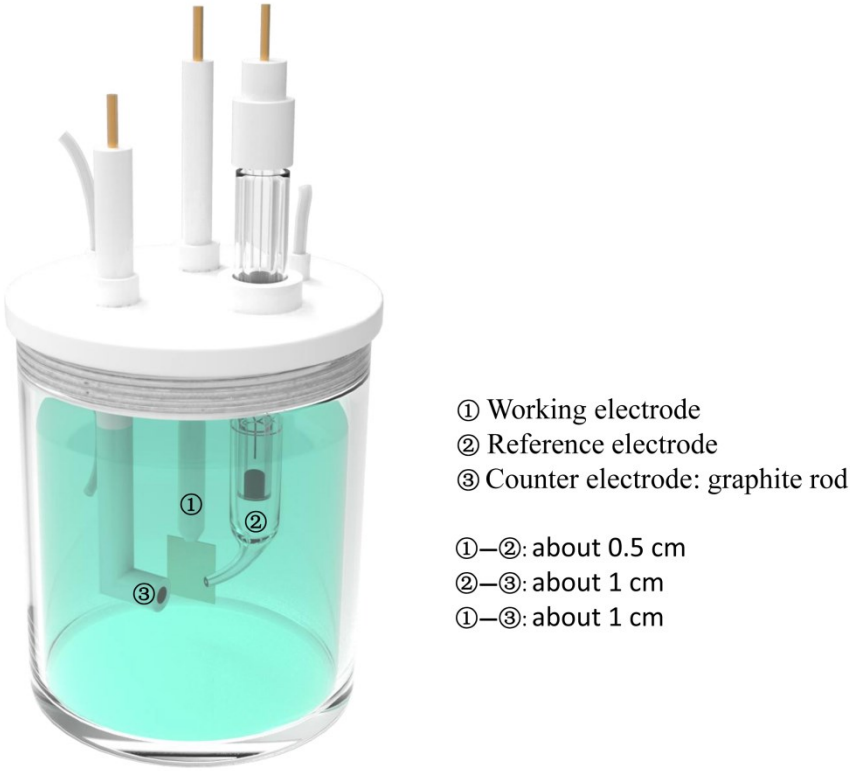

Figure S1. Schematic diagram of electrochemical experiment device

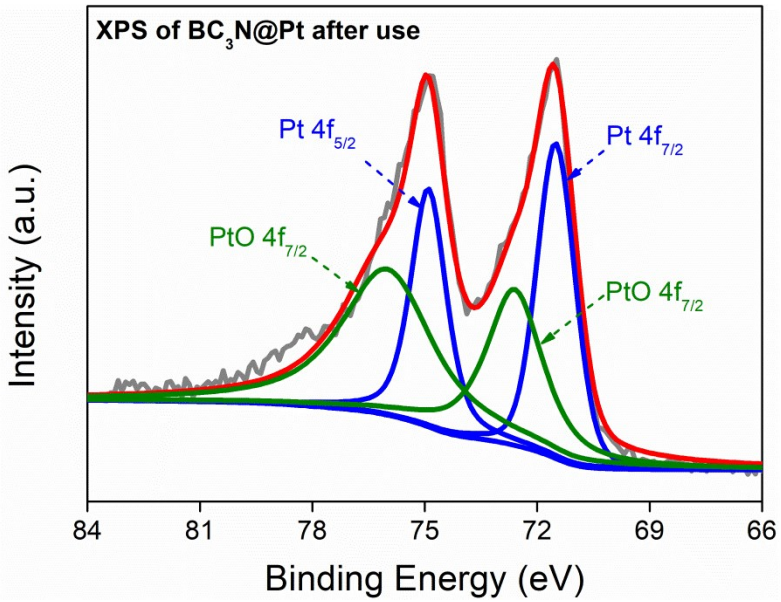

Figure S2. XPS (Pt binding energy region) of BCN@Pt after use

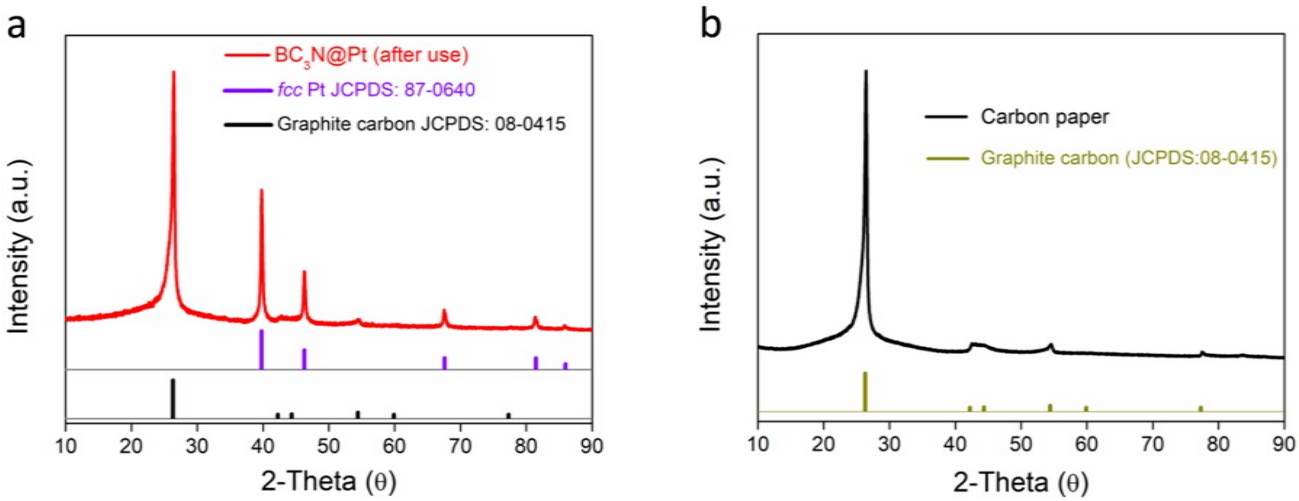

Figure S3. a) PXRD of BC_3N@Pt (on carbon paper) after use; b) PXRD of carbon paper

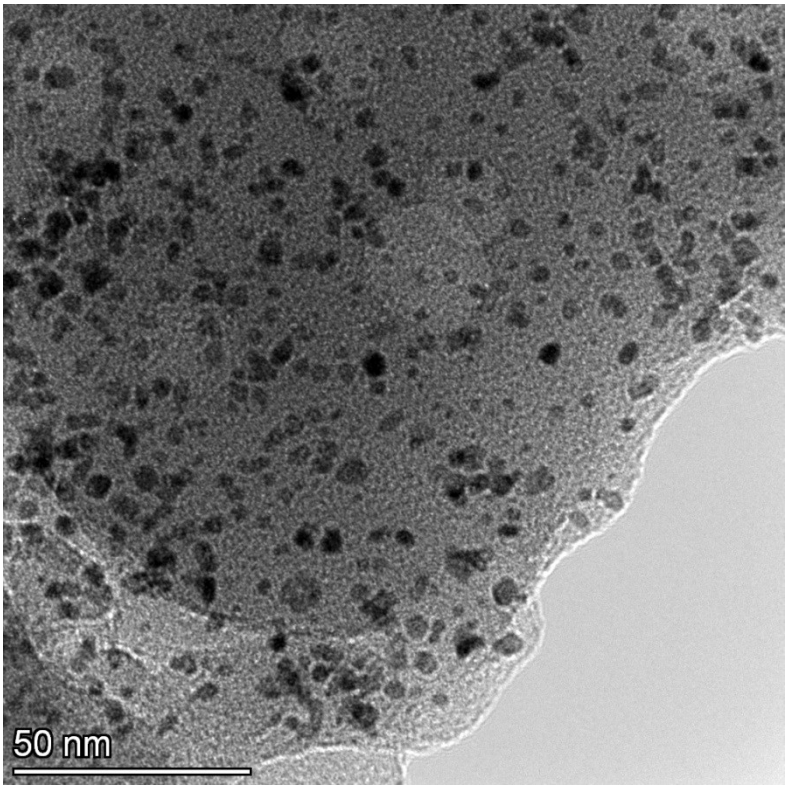

Figure S4. TEM image of BC_3N@Pt after use.

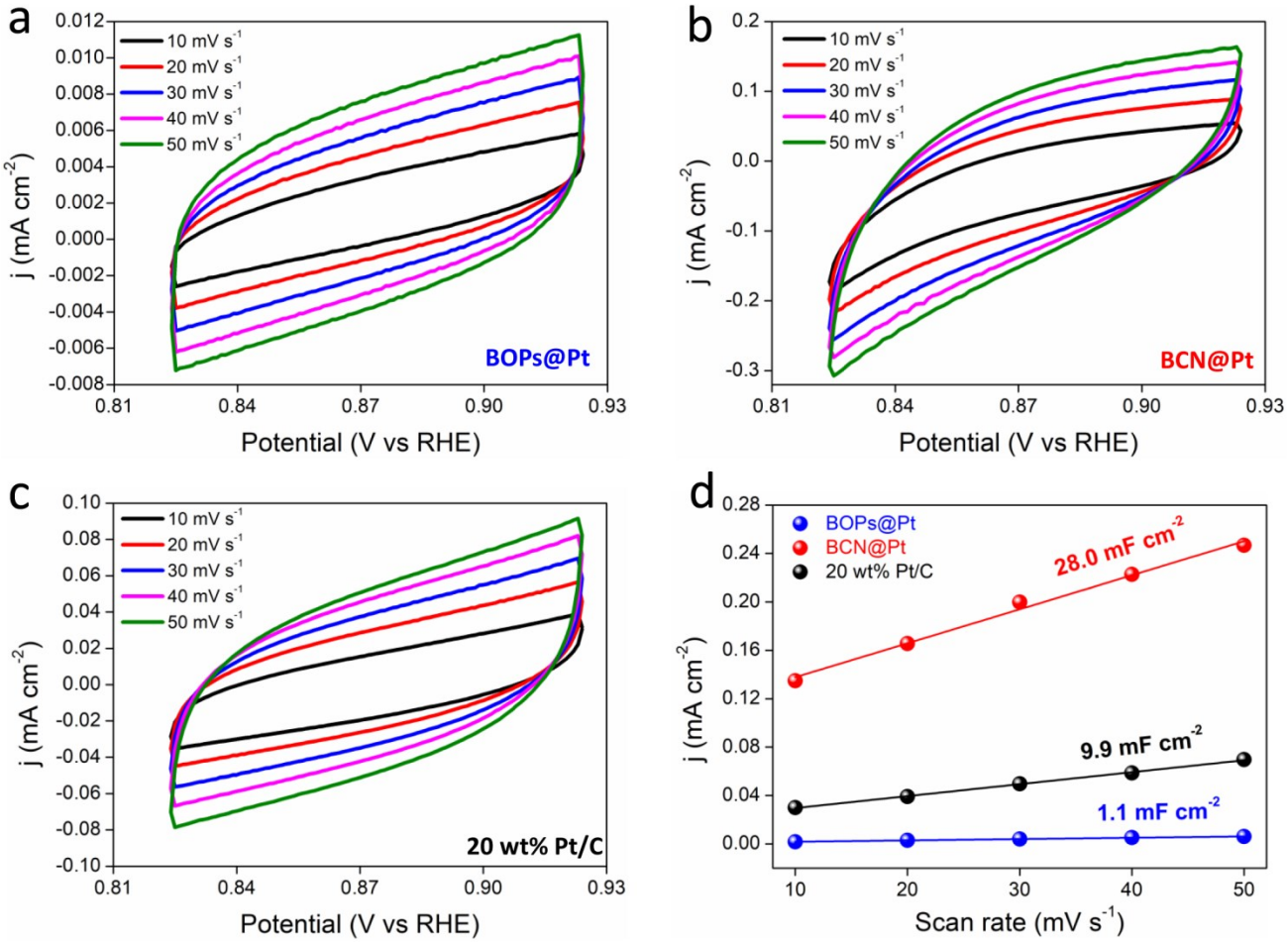

Figure S5. Cyclic voltammetry curves at different scanning speeds. a) BOPs@Pt was used as the working electrode; b) BCN@Pt was used as the working electrode; c) 20 wt% Pt/C was used as the working electrode; d) Cdl value converted from cyclic voltammetry data.

Table S1. Overpotentials of BC_3N@Pt with other recently reported Pt-based E-HER catalysts.			
Catalyst	**Electrolyte**	**η_{10} (mV)**	**Information Sources**
Pt/MBOPs	1 M KOH	22.8	*Journal of Materials Chemistry A, 2020, 8, 7171*
Pt/OLC	1 M KOH	38	*Nature Energy*, 2019, 4, 512-518
PtNi-O/C	1 M KOH	39.8	*Journal of the American Chemical Society*, 2018, 140, 9046-9050
PtNWs/SL-$Ni(OH)_2$	1 M KOH	70	*Nature Communications*, 2015, 6, 6430
NiOx/Pt_3Ni	1 M KOH	40	*Angewandte Chemie International Edition*, 2016, 55, 12859
Pt_3Ni_2-NWs/SC	1 M KOH	42	*Nature Communications*, 2017, 8, 14580
Mo_2C@NC@Pt	1 M KOH	47	*ACS Applied Materials & Interfaces*, 2019,11, 4047-4056
Pt on WS_2	1 M KOH	45	*Advanced Materials*, 2018, 30, 1704779
Pt/NiO@Ni/NF	1 M KOH	34	*ACS Catalysis*, 2018, 18, 8866-8872
Pt/$Ni(HCO_3)_2$	1 M KOH	44	*Angewandte Chemie International Edition*, 2019, 58, 5432-5437
CDs/Pt PANI	1 M KOH	56	*Applied Catalysis B: Environmental*, 2019, 257, 117905
A-CoPt-NC	1 M KOH	32	*Angewandte Chemie International Edition*, 2019, 58, 9404
C Pt@ZIF-67	1 M KOH	32	*Journal of Materials Chemistry A*, 2018, 6, 1376-1381
Pd/Cu-Pt	1 M KOH	22.8	*Angewandte Chemie International Edition*, 2017, 56, 16047
PtCoFe@CN	1 M KOH	45	*ACS Applied Materials & Interfaces*, 2017, 9, 3596-3601
Pt_5/HMCS	1 M KOH	46.2	*Advanced Materials, 2020, 32, 1901349*
Pt@PCM	1 M KOH	105	*Science Advances, 2018, 4, eaao6657*
Pt/CNW@PCN-222	1 M KOH	115	*Small, 2020, 16, 2005111*
Pt/GHSs	1 M KOH	27	*Small Structures, 2021, 2, 2000017*
Pt1/NMHCS	1 M KOH	40	*Advanced Materials, 2021, 2008599*
BC_3N@Pt	**1 M KOH**	**26.1**	***This Work***
BC_3N@Pt	**1 M PBS**	**38.5**	
BC_3N@Pt	**0.05 H_2SO_4**	**23.1**	

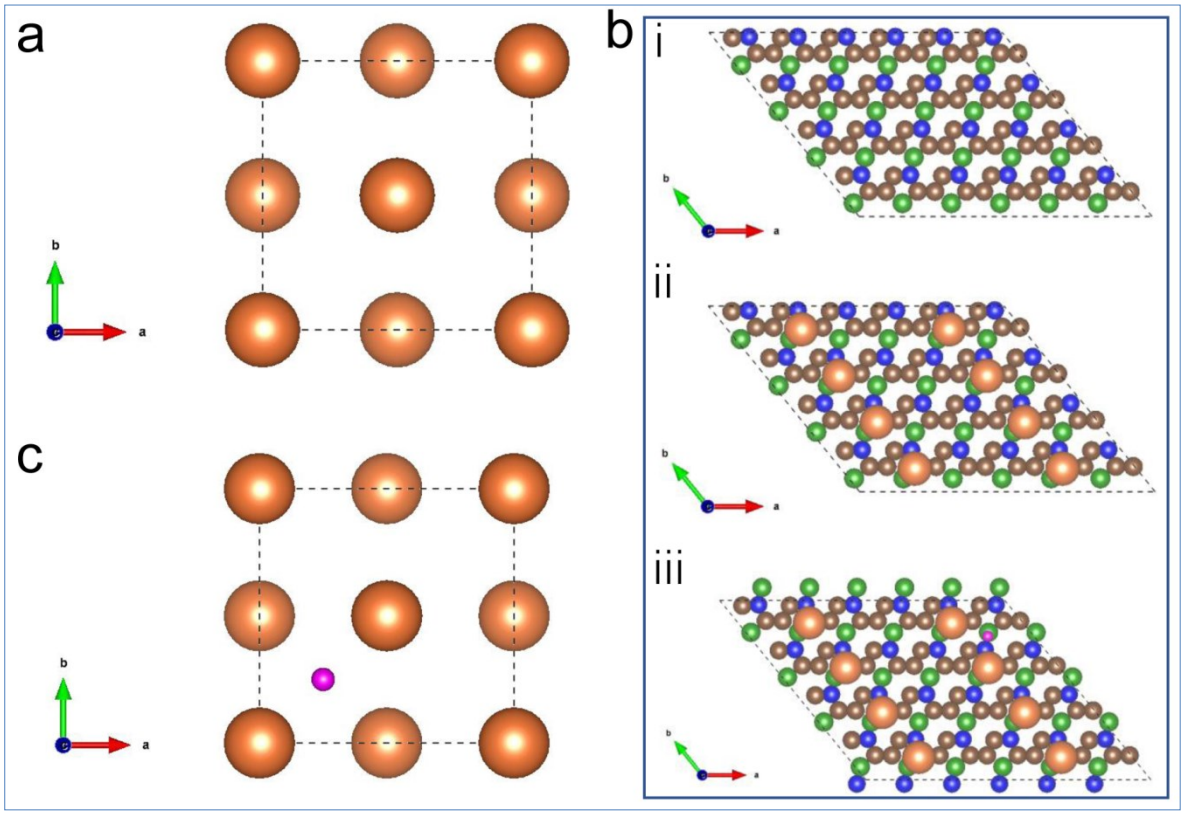

Figure S6. a) Crystal structure of Pt; b) Crystal structures of BC_3N (i), BC_3N@Pt (ii) and Pt/H*/BC_3N (iii); c) Crystal structure model of Pt/ H*.