Supporting Information

Electrocatalytic reduction of $PhCH_2Br$ on Ag-Y zeolite modified electrode

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1. Materials and Instruments

All reagents were used as received.

XRD patterns were collected using a Rigaku Ultima IV diffractometer with nickel filtered Cu Kα radiation at 35 kV and 25 mA.

SEM images were obtained on a Hitachi S-4800 field-emission scanning microscope.

TEM analyses were carried on a FEI TECNAI G2 F30 operating at 300 KV.

The amounts of Si, Al, Na and Ag etc. in zeolites were quantified by ICP on a Thermo IRIS Intrepid II XSP atomic emission spectrometer after dissolving the samples in HF solution.

Nitrogen adsorption–desorption isotherms at -196 ^{o}C were obtained on a BELSORP-max volumetric adsorption analyzer. The samples were out-gassed at 300 ^{o}C for 6 h before the adsorption measurement. The specific surface area was determined by the BET method using the data points of P/P_0 in the range of about 0.01-0.2 and the micropore surface area and the micropore volume of the samples were calculated using the *t*-plot method.

XPS was measured using a Thermo Fisher Scientific ESCALAB 250 spectrometer with Al Kα radiation (1486.6 eV) as incident beam with a monochromator.

H_2-TPR and O_2-TPO analysis was carried out with the Quantachrome Chem 3000 apparatus.

All electrochemical experiments were performed on a CHI 660D electrochemical work station (Chenhua, Shanghai, China) in an undivided cell.

2. General procedure

2.1 Prepare Ag-exchanged Y zeolite

Prior to Ag^+ ion exchange, the impurity extraframework cations of NaY were removed by treatment in 0.1 M $NaNO_3$ for 2 h, followed by filtering, washing with distilled water and drying. The catalysts were prepared by impregnation of 0.5 g NaY in 50 mL 0.04 M $AgNO_3$ solution for 2 h under stirring in the dark at room temperature. After filtering, washing 3 times with distilled water and drying at 100^{o}C for 1 h, a white powder was obtained. Then the samples were calcinated at 350^{o}C for 3 h to obtain a little yellow powder, labeled Ag-Y.

2.2 Prepare Ag-Y/GC modified electrodes

Prior to the modification, GC electrode was polished with 0.5 μm alumina, and then sonicated for 5 min each in distilled water and acetone. 3 mg Ag-Y was adhered to the electrode surface with 10 uL POV as adhesive. The modified electrode, labeled Ag-Y/GC, was air dried.

2.3 Electrochemical process

Linear sweep voltammograms were carried out using a traditional three-electrode system with a GC (d = 2 mm), Ag (d = 2 mm), or Ag-Y/GC (d = 2 mm) as working electrode, a Pt wire as counter electrode and a Ag/AgI/I^- as reference electrode, in MeCN – 0.1 M $TEABF_4$ – 5 mM $PhCH_2Br$ solution.

Potentiostatic electrolysis were carried out with a Ag, GC or Ag-Y/GC as working electrode, a Mg rod as sacrificial anode and a Ag/AgI/I^- as reference electrode, in MeCN – 0.1 M $TEABF_4$ – 0.1 M $PhCH_2Br$ solution in the presence of N_2 or CO_2. The products were extracted by diethyl ether and quantitatively analyzed by GC instrument (GC-2014, Shimadzu). For the electrocarboxylation carried out in the presence of CO_2, the electrolyte should be esterified by addition of anhydrous K_2CO_3 and methyl iodide at 50-60^{o}C for 5 h before the extraction.

3. N_2 adsorption-desorption isotherms

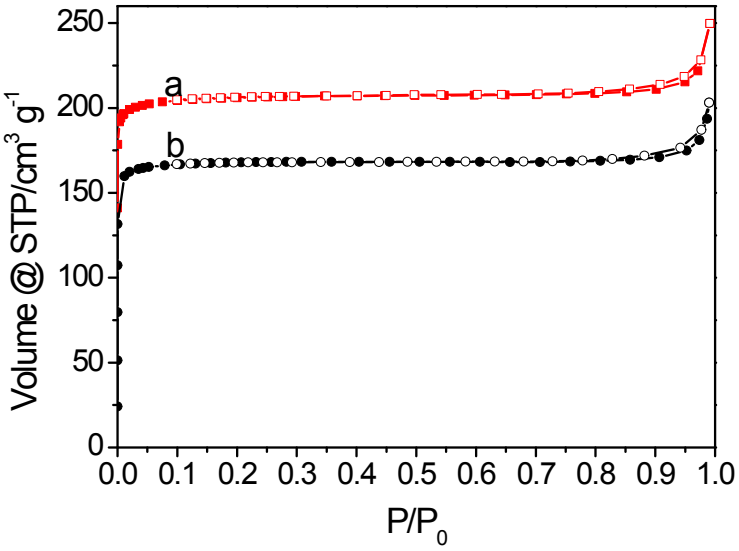

Fig. S1 N_2 adsorption-desorption isotherms of (a) NaY and (b) Ag-NaY

4. ICP data for Ag-Y

Table S1 Influence of concentration of $AgNO_3$ to exchange capacity

Entry	Zeolite	C_{Ag+} (mol L^{-1})	Ion concentration (g L^{-1})				Exchange capacity
			Ag^+	Na^+	Si^{2+}	Al^{3+}	
1	NaY	0	----	82.9	319.9	104.8	----
2	Ag-Y-2	0.02	186.8	46.3	294.4	102.3	25
3	Ag-Y-4	0.04	285.3	23.3	282.4	97.9	39
4	Ag-Y-6	0.06	337.4	18.0	301.8	104.8	43
5	Ag-Y-8	0.08	344.6	8.3	265.5	98.7	48