Electronic supplementary information

One-Step Electrochemical Fabrication of Nanoporous Gold Wire Arrays from Ionic Liquid

Experimental details

All experiments were performed in a nitrogen-filled glove box. The deposition solutions were prepared by the dissolution of $HAuCl_4 \cdot 3H_2O$ (Alfa Aesar, 99.99%) at various molar ratios into 40-60 mol% $ZnCl_2$-EMIC IL at 90 ºC. All electrochemical experiments were carried out in a three-electrode cell using an EG&G model 263 potentiostat/gavanostat controlled with EG&G model 270 software. An Au wire was used as the counter electrode and a Zn wire (99.95%) immersed in 50-50 mol% $ZnCl_2$-EMIC solution contained in a fritted glass tube was used as the reference electrode. A W wire (area = 0.112 cm^2) was used as the working electrode for cyclic voltammetry and as the substrate for electrodeposition. A screen-printed electrode (area = 0.19 cm^2) was used as the substrate for electrocatalysis. The metal substrates were cleaned with 2 M HNO_3 and distilled water, and dried in a vacuum before use. The surface morphologies of the Au nanowires and nanoporous wires were observed by field-emission scanning electron microscopy (FE-SEM, XL40-FEG), environmental scanning electron microscopy (ESEM, FEI Quanta 400 F), and transmission electron microscopy (TEM, JEOL JEM-2100F CS STEM). The structures of the Au nanowires and nanoporous wires were analyzed by X-ray diffraction (XRD, Shimadzu, XRD-7000).

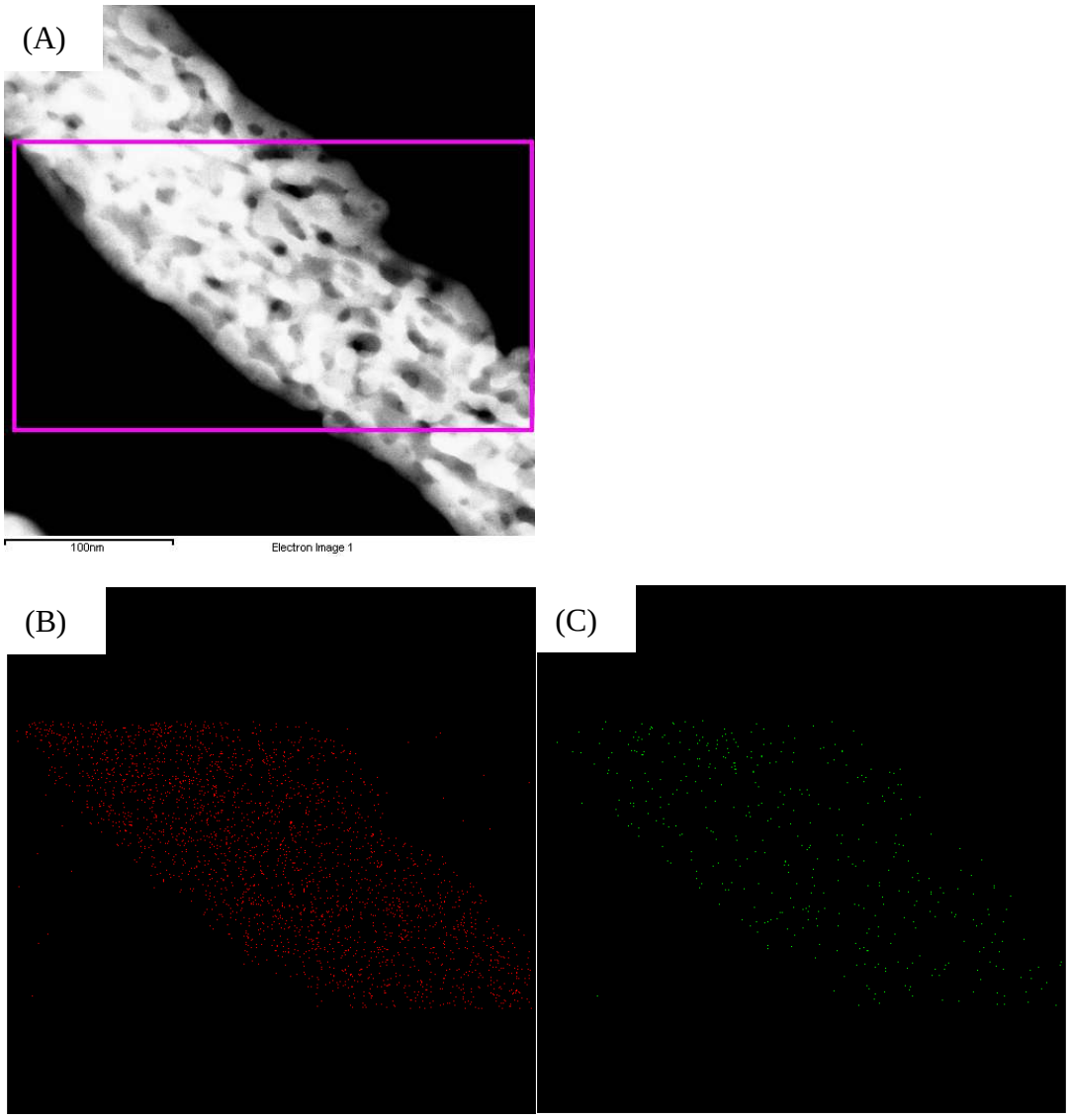

Fig. S1. A) HAADF image of the nanoporous wires; TEM element mappings of the area selected in (A), (B) Au-element, (C) Zn-element.