Supplementary information for

Controlled Growth of Platinum Nanowire Arrays on Sulfur Doped Graphene

as High Performance Electrocatalyst

Rongyue Wang, Drew C Higgins, Md. Ariful Hoque, DongUn Lee, Fathy Hassan,

Zhongwei Chen*

Department of Chemical Engineering, Waterloo Institute for Nanotechnology, Waterloo Institute for Sustainable Energy, University of Waterloo, 200 University Avenue West, Waterloo, Ontario, N2L 3G1, Canada.

*Corresponding author: Telephone: 1-519-888-4567 ext. 38664

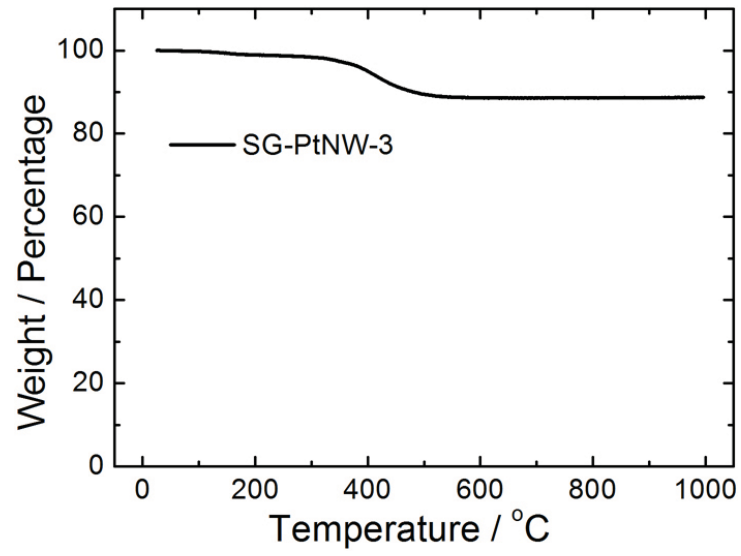E-mail: zhwchen@uwaterloo.ca

Figure S1. TGA mass loss of SG-PtNW-3 sample with the increase of temperature

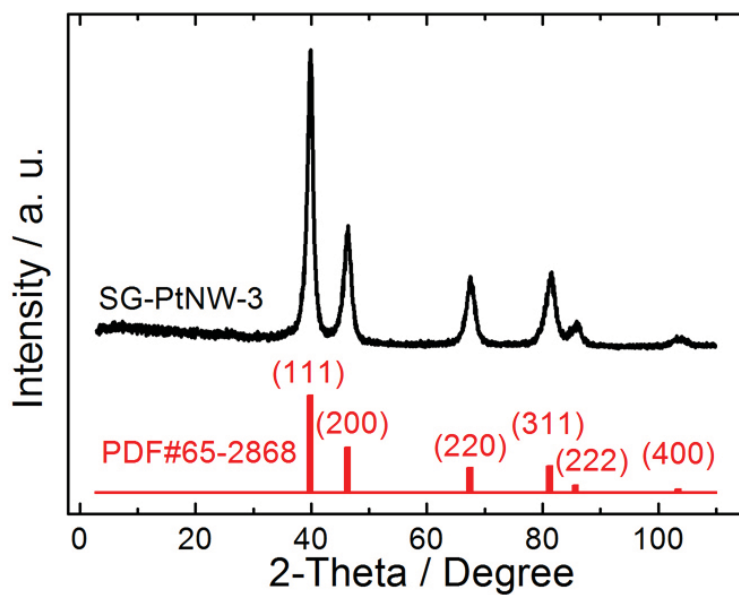(heat rate: 10 $^{\circ}$C per min) in air.

Figure S2. XRD pattern of SG-PtNW-3 sample with the standard pattern of Pt (JCPDS 65-2868) as a comparison.
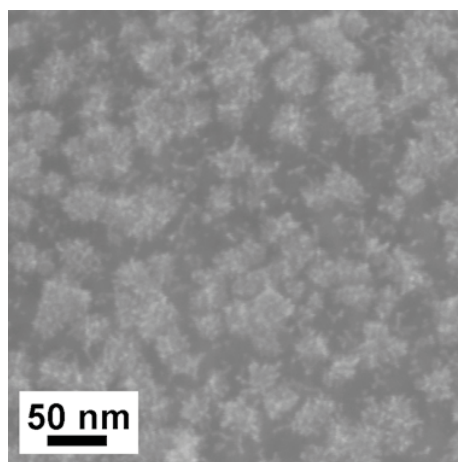

Figure S3. High resolution SEM image of SG-PtNW-1 sample shown in Figure 2a.
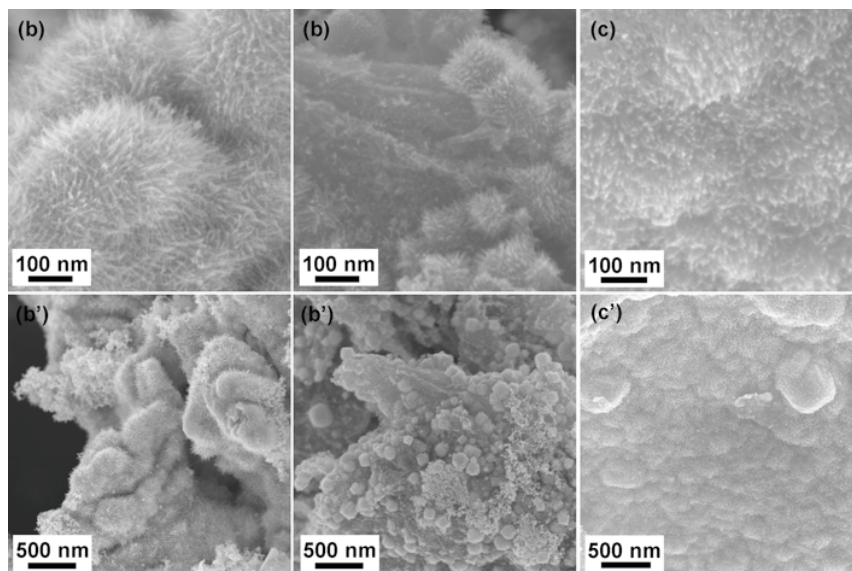
Figure S4. SEM images of Pt nanowires grown on graphene (a, a', b, and b') and sulfur doped graphene (c and c') with a Pt mass loading of 95%. Both the concentrations of G and Pt precursor in b, b' (or SG in c, and c') are half of the typical synthesis conditions.
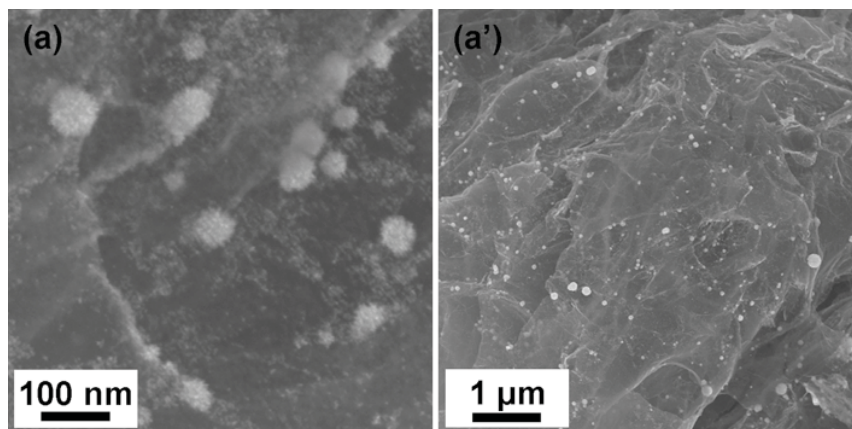
Figure S5. SEM images of Pt nanowires grown on graphene with Pt mass loading of 50.6%. Both the concentrations of G and Pt precursor are half of the typical synthesis conditions.

Element	Weight %	Atomic %	Net Int.	Net Int. Error
C K	88.96	94.39	3798.2	0
O K	2.42	1.93	70	0.01
Al K	3.39	1.6	357.7	0
S K	5.23	2.08	360.1	0

Status: Collecting CPS   DT   Lsec: 286.7 0 Cnts 0.000 keV Det: ApolloXLSDD Det   Reso
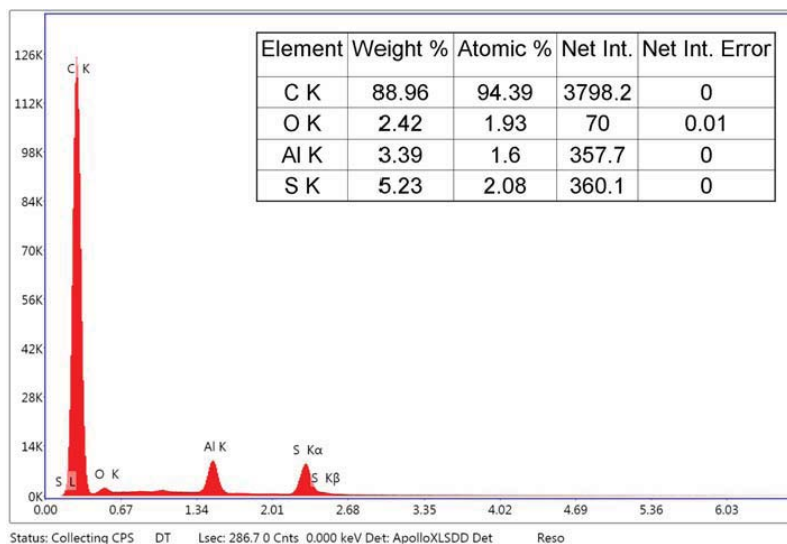
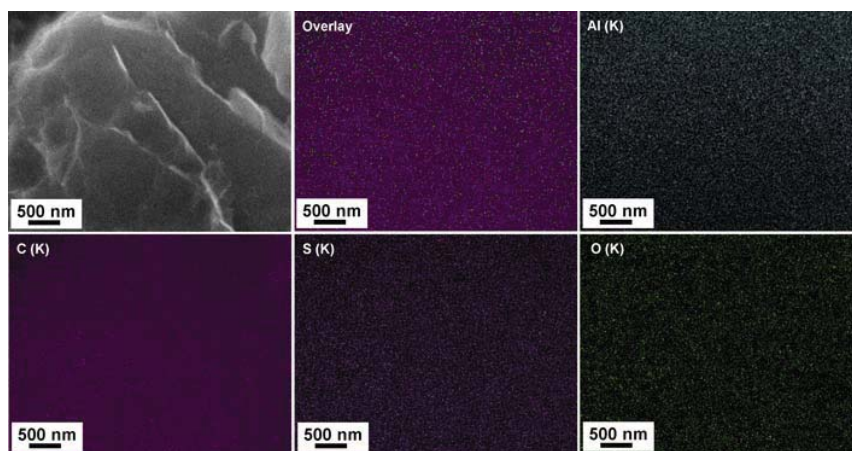Figure S6. Energy dispersion spectroscopy (EDS) results of SG.

Figure S7. SEM of sulfur doped graphene and the corresponding EDS mappings which show the elemental distribution. The Al signal is from the aluminum foil which was used as a support for EDS analysis.