

Synergistic Effect of Polyaniline on Stabilizing Pt Nanoparticles in PEM Fuel Cells

Chenzhao Li^{1,2}, Limin Zhu^{1,3,*}, Liang Song⁴, Guangqi Zhu¹, Qi Zhang¹, Yuyue Zhao^{1,6}, Qing Gong¹, Chengjun Sun⁵, Yuzi Liu⁶, Kotaro Sasaki⁴, and Jian Xie^{1,*}

¹ Department of Mechanical and Energy Engineering, Purdue School of Engineering and Technology, Indiana University-Purdue University Indianapolis, Indianapolis, Indiana 46202, USA

² School of Mechanical Engineering, Purdue University, West Lafayette, Indiana 47906, USA

³ School of Chemistry and Chemical Engineering, Henan University of Technology, Zhengzhou 450001, China

⁴ Chemistry Division, Brookhaven National Laboratory, Upton, New York 11973, USA

⁵ Advanced Photon Source, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, Illinois 60439, USA

⁶ Center for Nanoscale Materials, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, Illinois 60439, USA

* Corresponding authors: Jian Xie, jianxie@iupui.edu

Limin Zhu, lmzhu@haut.edu.cn

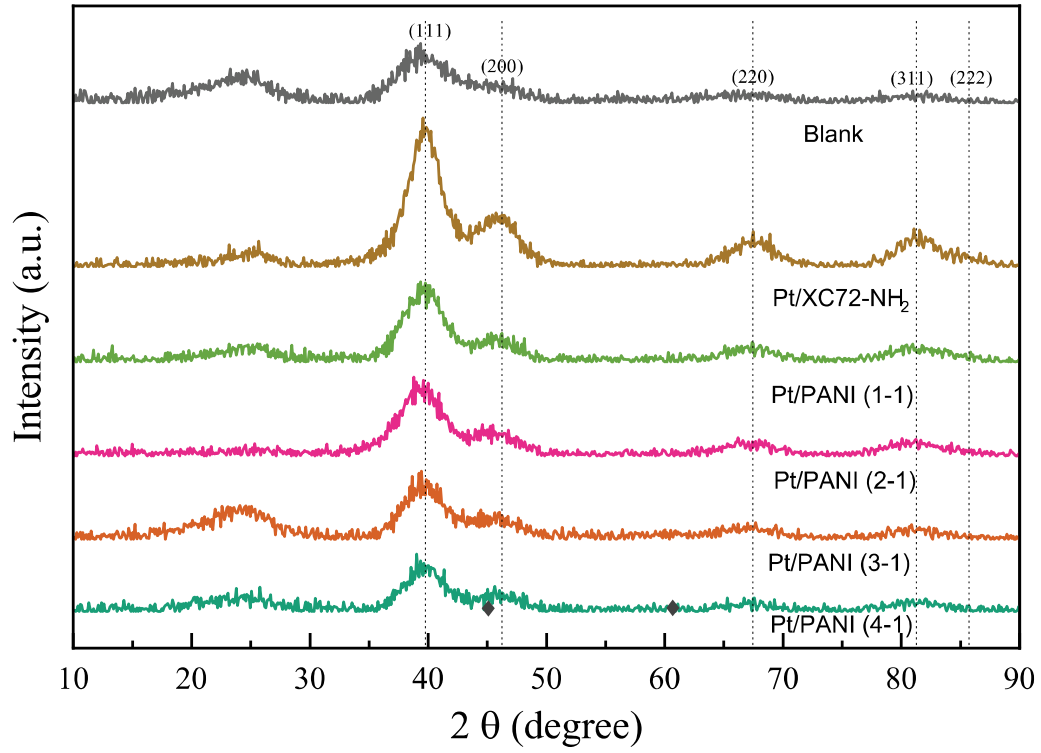


Figure S1. X-Ray diffraction (XRD) results of blank, Pt/XC72-NH₂, 1-1, 2-1, 3-1, and 4-1 catalyst.

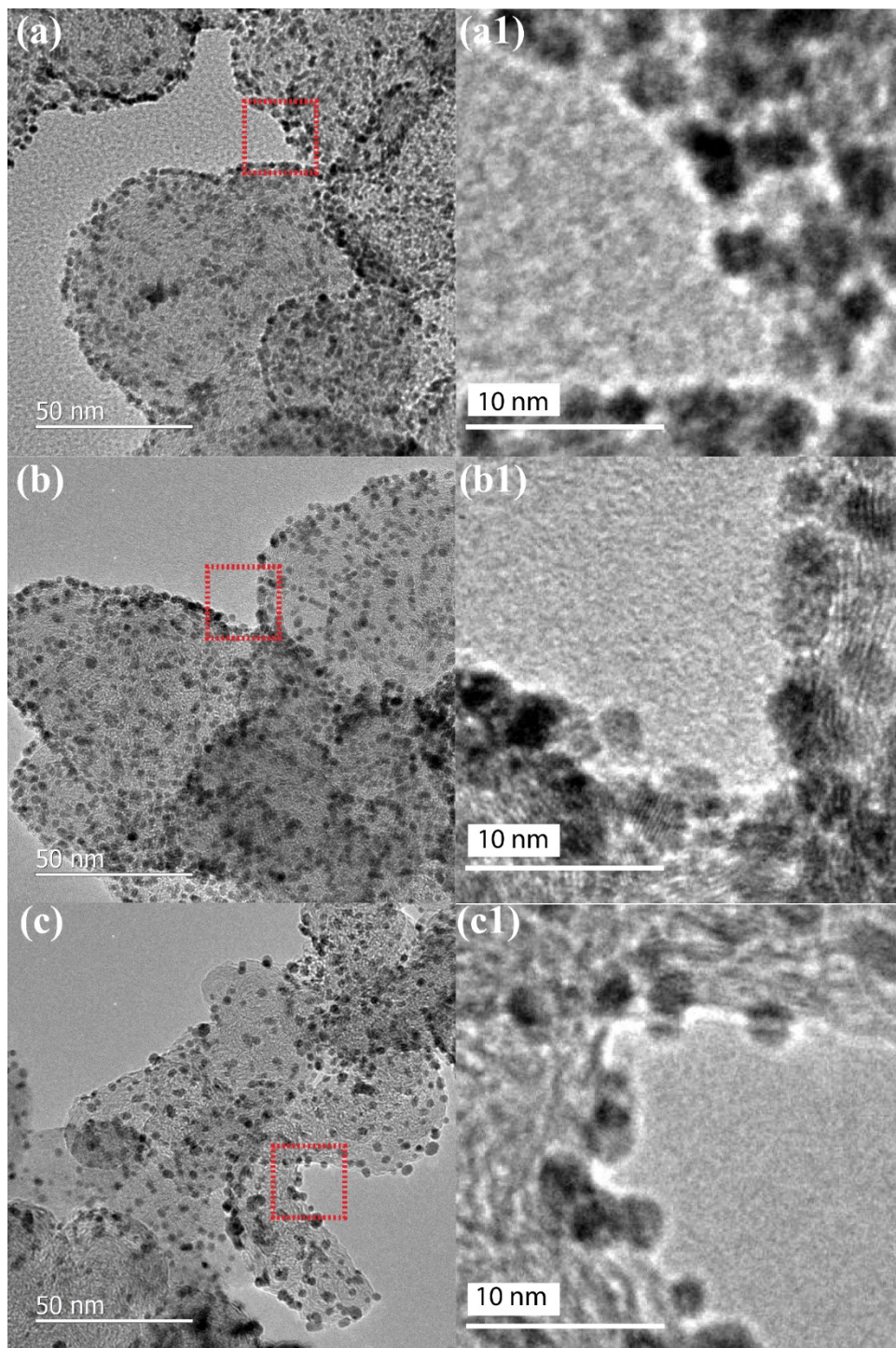


Figure S2. Transmission electron spectroscopy (TEM) image of (a) 3-1 sample, (a1) zoom in of rectangular with red dash line of (a), (b) 4-1 sample, (b1) zoom in of rectangular with red dash line of (b), and (c) 4-1 sample, (c1) zoom in of rectangular with red dash line of (c).

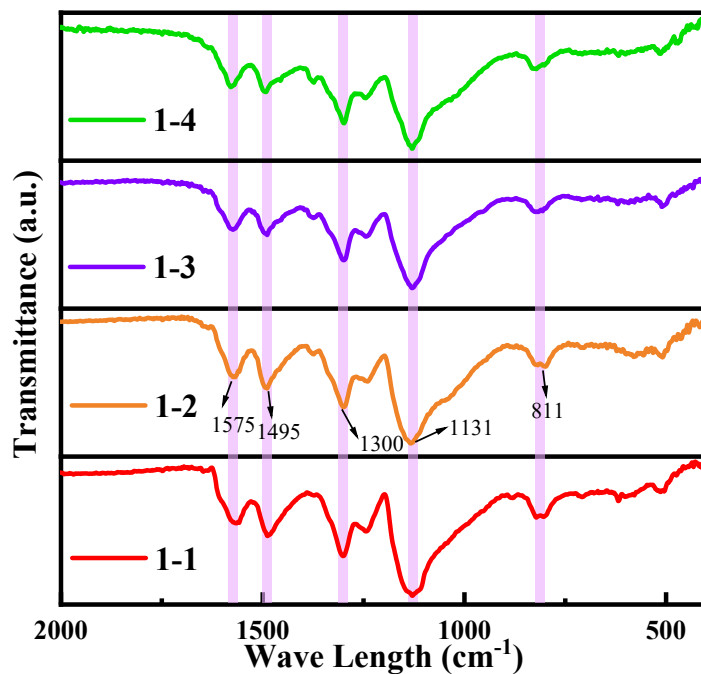


Figure S3. Fourier transform infrared (FT-IR) spectrum results of polyaniline grafted carbon.

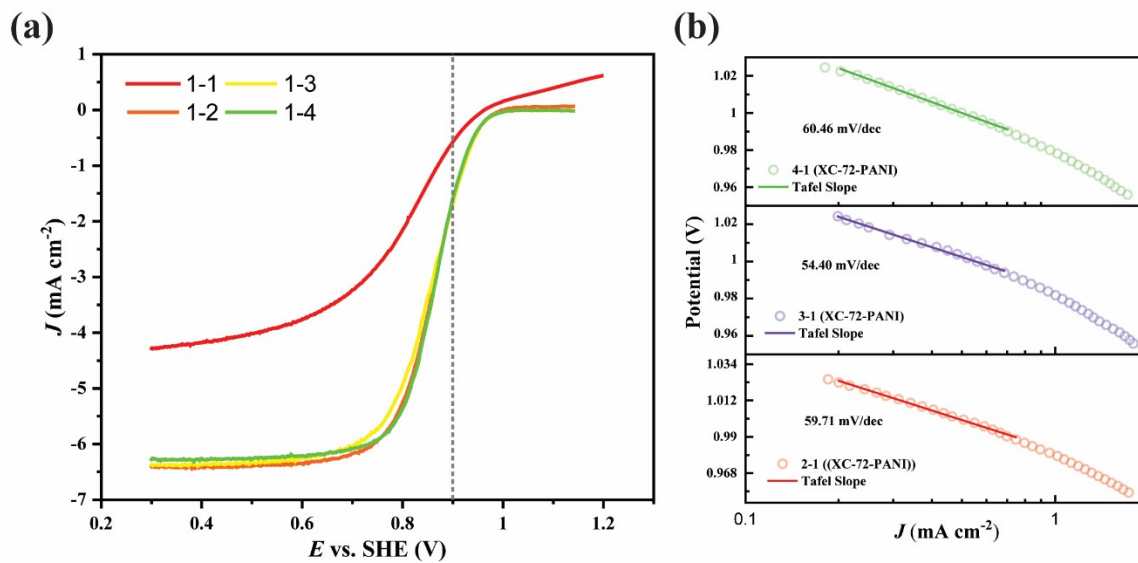


Figure S4. (a) ORR polarization curves of 1-1, 2-1, 3-1, and 4-1 sample, (b) Tafel slope of 2-1, 3-1, 4-1 samples. ORR polarization curve measured on the RDE in a O_2 -saturated 0.1 M $HClO_4$ solution at a scan rate of 10 mV/s with a rotation speed of 1600 rpm

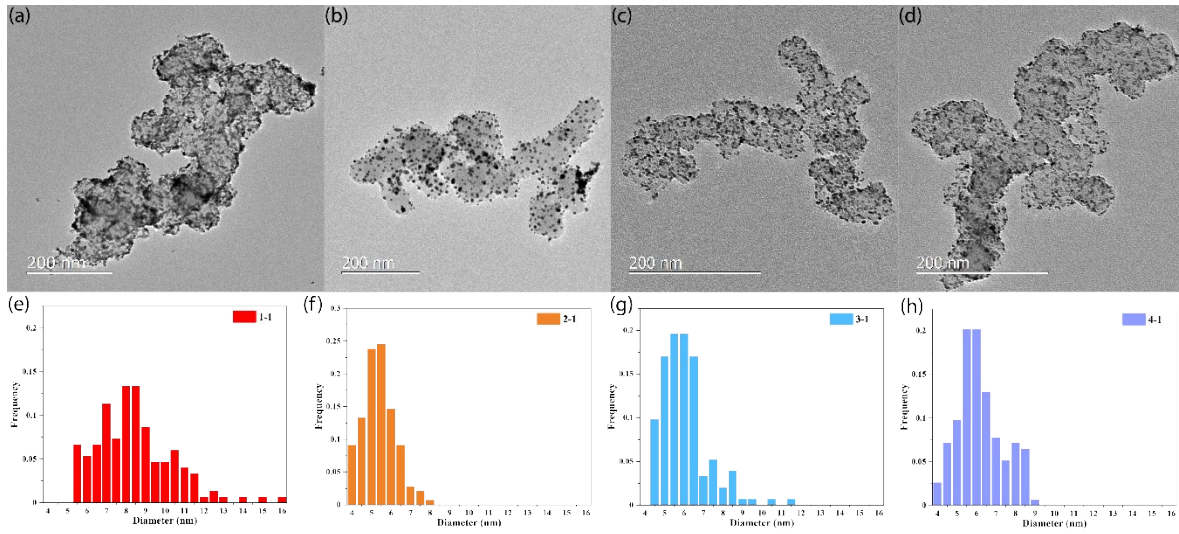


Figure S5. image of (a) 1-1 sample, (b) 2-1 sample, (c) 3-1 sample, (d) 2-1 sample after 30k accelerating stress testing (AST), and their particle size distribution of (e) 1-1, (f) 2-1, (g) 3-1, and (h) 4-1 sample.