



Supporting Information

for

A novel approach to pulsed laser deposition of platinum catalyst on carbon particles for use in polymer electrolyte membrane fuel cells

Bogusław Budner, Wojciech Tokarz, Sławomir Dyjak, Andrzej Czerwiński,
Bartosz Bartosewicz and Bartłomiej Jankiewicz

Beilstein J. Nanotechnol. **2023**, *14*, 190–204. [doi:10.3762/bjnano.14.19](https://doi.org/10.3762/bjnano.14.19)

Additional figures

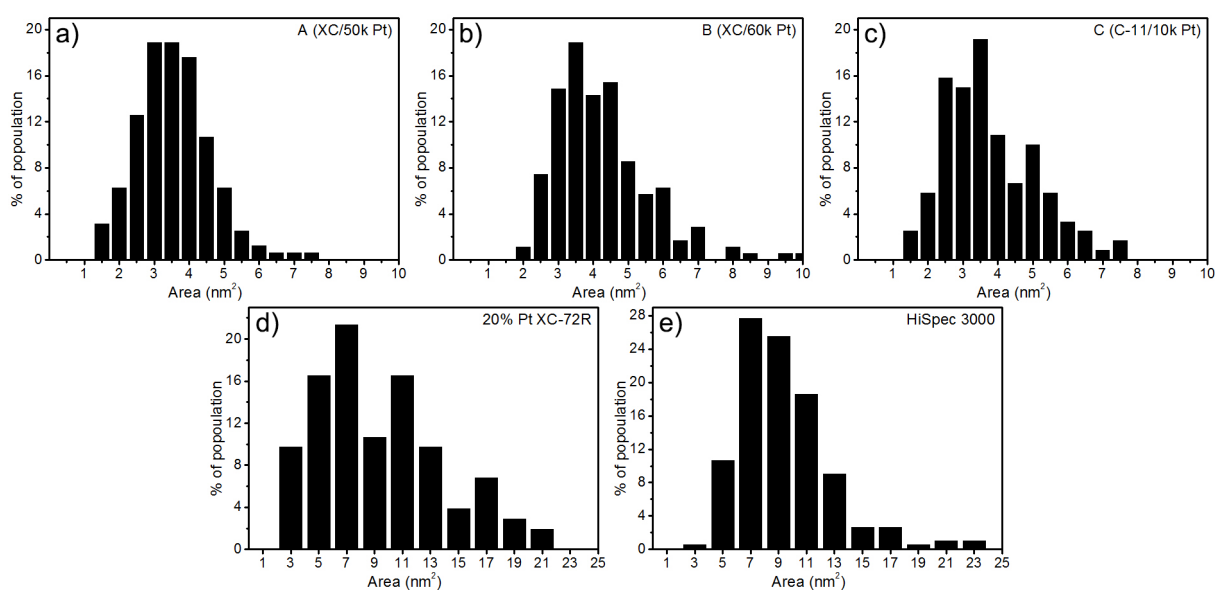


Figure S1: Statistical analysis of Pt nanoparticles area distribution based on the HRTEM images.

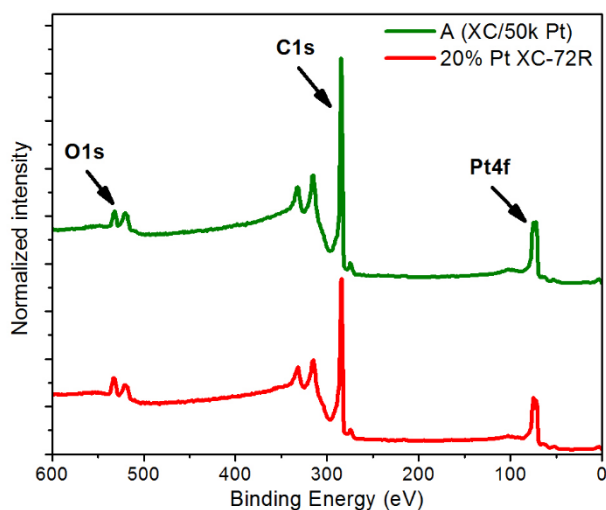


Figure S2: Low-resolution XPS spectra of the reference catalyst 20% Pt XC-72R (red line) and sample A (green line) prepared using the PLD method characterized by a similar Pt-to-C ratio.

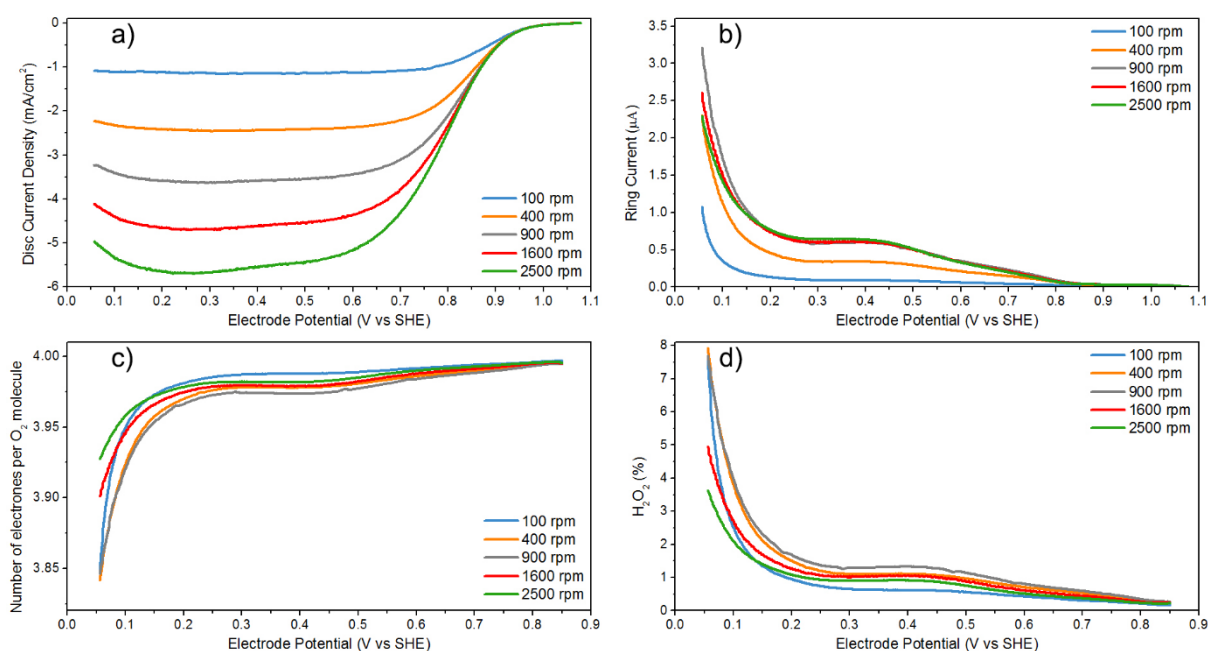


Figure S3: ORR curves recorded for sample B (XC/60k Pt) in the rotating disc electrode setup (at 100, 400, 900, 1600, and 2500 rpm), deposited on the GC disc electrode: (a) disc current density for the ORR, (b) corresponding limiting ring current at a fixed potential of 1.030 V, (c) a number of electrons per O₂ molecule formed during the ORR, (d) % H₂O₂ formed during the ORR. Curves (c) and (d) are calculated from the data in panels (a) and (b) using Equations 1 and 2, respectively, with $\eta = 0.152$ for 900 rpm. The thin film RRDE experiments were carried out in a four-electrode arrangement in 0.5 M H₂SO₄ solution oxygenated with pure O₂ at 20 °C and 1 bar O₂, with a potential scan rate of 5 mV/s.

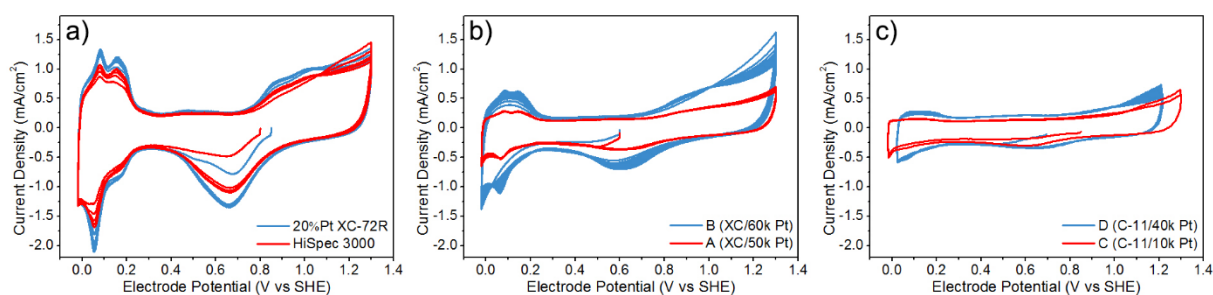


Figure S4: Cyclic voltammograms recorded in the rotating disc electrode setup for Pt-based catalyst deposited on the GC disc electrode: (a) reference catalyst 20% Pt XC-72R and HiSpec 3000, (b) materials A and B with Pt deposited on Vulcan XC-72R, (c) materials C and D with Pt deposited on synthesized carbon material C-11. Curves were recorded in N₂-saturated 0.5 M H₂SO₄ solution (1 bar N₂ pressure, 20 °C, potential scan rate 50 mV/s).