Pajarito Powder

Pt and Pt Alloy on Engineered Catalyst Support™ (ECS)

Pajarito Powder develops and manufactures advanced PGM catalysts for PEM fuel cell (anode) and PEM and alkaline electrolyzer (cathode) utilizing proprietary Engineered Catalyst Support™ (ECS) that leverage the attributes of interconnected mesoporous carbons (IMCs) to enhance and stabilize the PGM nanoparticles, while making the most effective use of the PGM surface area.

Pt and Pt Alloy Catalysts on ECS™

Pajarito Powder PGM catalysts utilize Engineered Catalyst Supports™ and a variety of Pt and Pt alloys.

Figures to the right demonstrate X-Ray Diffractogram (XRD) crystallite size, which highlights our control over the size distribution of platinum and stabilized platinum alloy nanoparticles on ECS materials.

Fig. A

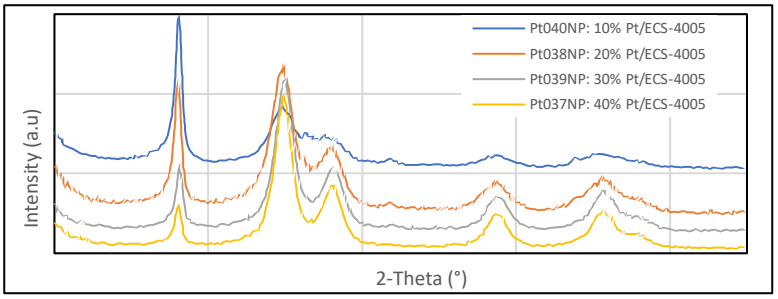


Fig. A Highly Graphitic ECS

10-40 wt% Pt on ECS-004005, Pt crystallite <3 nm

Fig. B

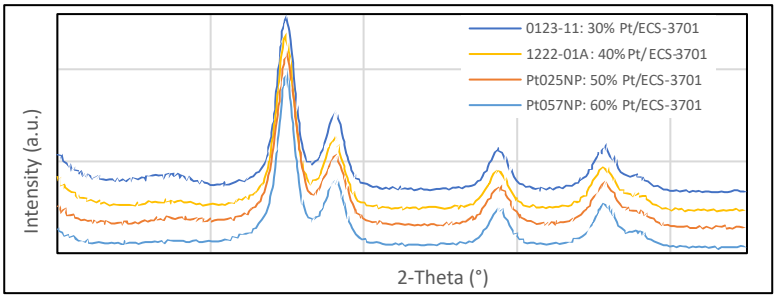


Fig. B Mesoporous ECS

30-60 wt% Pt on ECS-004601, Pt 2.8 nm ±0.3 nm

Fig. C PtCo alloy on Mesoporous ECS

50-5 wt% PtCo on ECS-003701, Pt 2.5 nm ±0.3 nm

- Pt795: 3.85Å lattice calculation, 99.5% alloyed
- Pt048NP: 3.88 Å lattice calculation, 93.4% alloyed

Fig. C

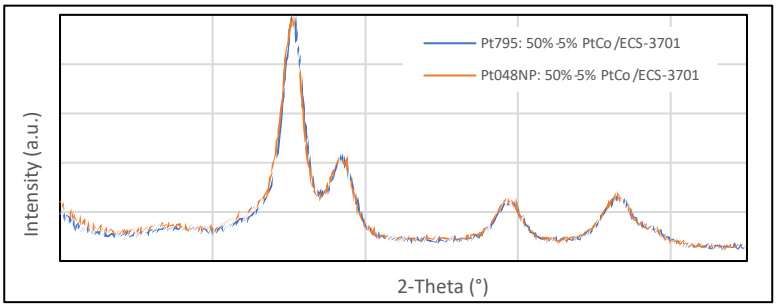
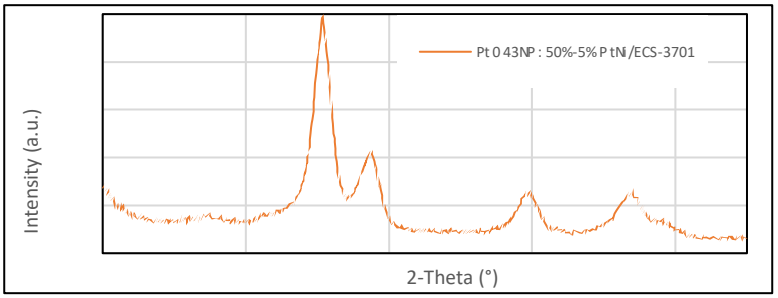


Fig. D PtNi alloy on Mesoporous ECS

50-5 wt% PtCo on ECS-003701, Pt 2.9 nm ±0.3 nm

- 3.83Å lattice calculation, 100% alloyed

Fig. D



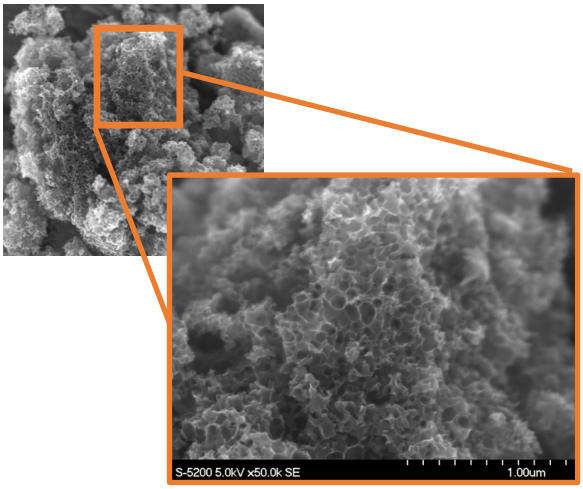
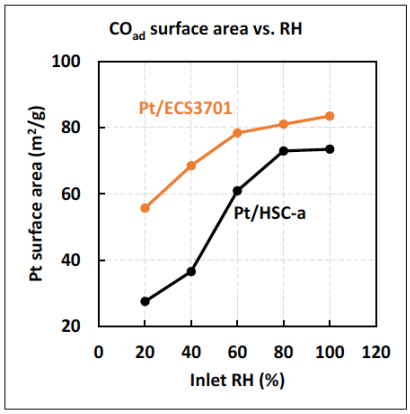
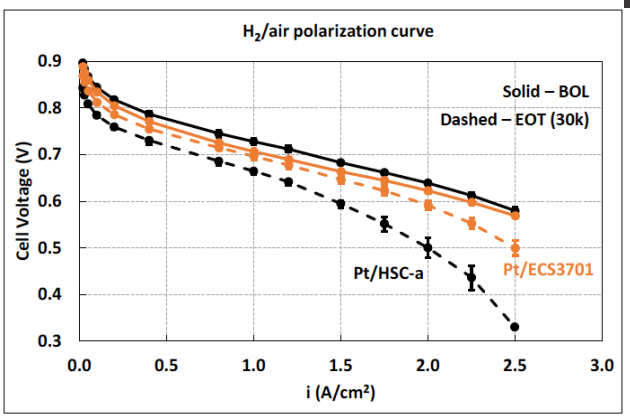


Fig.E





H$_2$/air, 80 °C, 100% RH, 150 kPaa (50% Pt, 0.2 mg/cm²)

50 wt% Pt / ECS-003701™

Presented at the DOE AMR by a partner of Pajarito Powder, Fig. E represents study materials utilizing ECS-003701, reflecting similar BOL performance to the reference catalyst but with substantially better EOL performance, demonstrating the advantages of IMCs.

Source: Durable Fuel Cell MEA through Immobilization of Catalyst Particle and Membrane Chemical Stabilizer
DOE Project Award # DE-EE0008821 June 8, 2022
https://www.hydrogen.energy.gov/pdfs/review22/fc323_ramaswamy_2022_o.pdf