The Ceramic MaxPhase™ coating is the primary choice by automotive companies globally for bipolar plates in PEM fuel cells. Unique properties for efficient and long-life fuel cells, in combination with very cost-effective production solutions, make the automotive industry rely on Impact Coatings as production ramp up for hydrogen-powered electrical vehicles.

Superior coatings for bipolar plates

- Low contact resistance
- High conductivity
- Outstanding corrosion resistance
- Cost-effective
The Ceramic MaxPhase™ coating enhances performance and lifetime of metal bipolar plates in fuel cells. The PVD (physical vapor deposition) coating is proven state-of-the-art for both proton exchange membrane fuel cells (PEMFC) and direct methanol fuel cells (DMFC).

Offering a unique combination of low contact resistance, high corrosion resistance, and low cost, it exceeds both performance and cost reduction targets set up by the US Department of Energy.

### COATING PROCESSES

1. Uncoated substrate
2. Remove oxide (vacuum)
3. Apply coating (vacuum)
4. Ventilation

**Source material**

- **Plasma**

**Oxide**

- **Steel substrate**

**Deposition of coating**

- **Steel substrate**

**Ceramic MaxPhase™**

- **Steel substrate**

The process is a vacuum-based plasma treatment and involves vaporization of the source material, which condenses on the substrate and forms a coating.

Ceramic MaxPhase consists of safe and low-cost materials: transition metals, group-A elements, and nitrogen and/or carbon.

### STACK TESTS WITH CERAMIC MAXPHASE™ COATED BIPOLAR PLATES

**Stack performance**

- **Time (h)**: 0, 500, 1000, 1500
- **Stack performance (%)**: 0%, 20%, 40%, 60%, 80%, 100%, 120%

**Cell voltage (V)**

- **Time (h)**: 0, 500, 1000, 1500, 2000
- **Cell voltage (V)**: 0.0, 0.2, 0.4, 0.6, 0.8, 1.0

Impact Coatings does not perform in-house stack tests. However, here are some general examples from our customers:

- Reported 4,000 hours of operation (stationary, 1 - 10 kW class)
- Reported 5,000 hours of operation (automotive)
- Provided the data above, for 1,500 and 2,000 hours tests