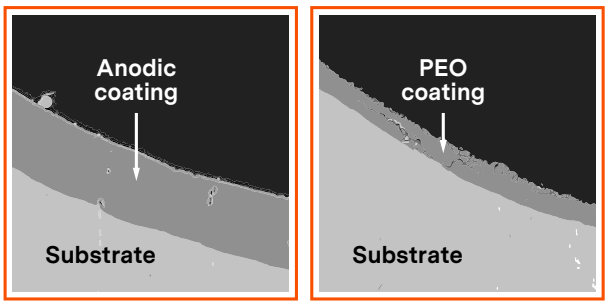
3 KEY CONSIDERATIONS WHEN SOURCING YOUR CHAMBER CLEANING RPS SYSTEM

1 The RPS chamber's coating composition



Anodic coating after exposure | **PEO coating after exposure**

Anodic or PEO coating?

- An **Anodic Layer** is much less susceptible to wear due to plasma exposure than Plasma Electrolytic Oxide (PEO) composition
- A **longer-lasting** protective layer means long-term cost savings

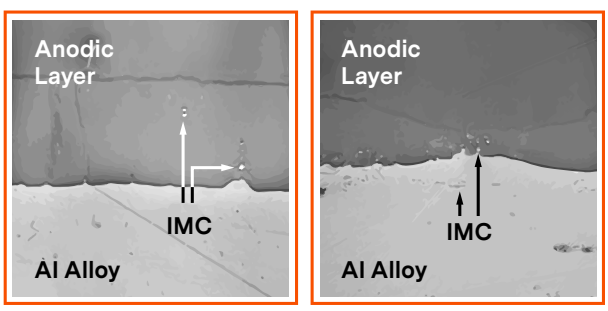
The sample coupons were exposed to ~64 hours of NF3 plasma

Process conditions:

Temp = 100C minimum **Gas** = NF3 250sccm **Pressure** = 250mT **Power** = 5kw **Cycle** 20 min on / 10 seconds off

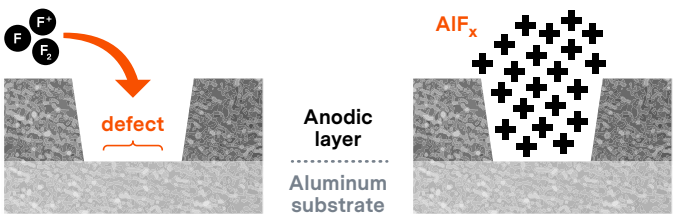
2 The quality of your substrate material

- **There is a difference** between 'can grade' aluminum and high-purity aluminum
- **Better substrate materials** produce better coatings that last much longer
- Find an RPS system that uses a **high-purity custom alloy** for the construction of the plasma chamber

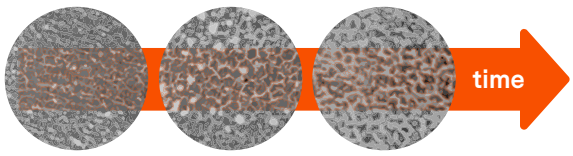


Inter-Metallic Compound (IMC) particles cause point failures and local anodic layer thinning

AlFx Particle Generation Mechanism:

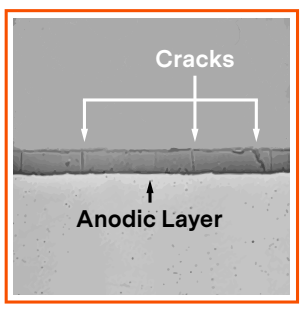


IMCs create defects which allow fluorine to attack the exposed aluminum substrate and create particles



Exposed to plasma, the defective coating wears away, exposing more aluminum and generating more particles

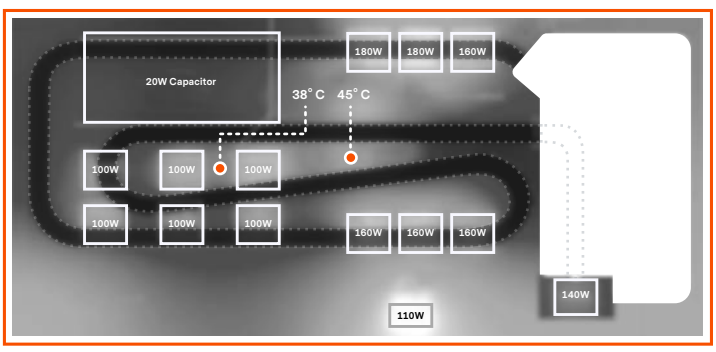
3 Temperature control capability



Expansion mismatch cracks the anodic layer at temperatures > 150°C

- **Thermal expansion mismatch** between the substrate and the protective coating can cause cracking which leads to degradation of the chamber
- Look for RPS systems that maintain temperature **below 90°C** in the inner surface of the reaction chamber when input water temperature is at 35°C.

Cooling System Design and Temperature Test Result



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