**POSTER PRESENTATION**

**Enhancing Corrosion Resistance of Cold-Sprayed Scalmalloy through Heat Treatment**

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Cold-sprayed Aluminum alloys are often prone to corrosion due to microstructural defects and inhomogeneities. This study investigates how carrier gas selection and post-deposition heat treatment induce microstructural modifications in cold-sprayed Scalmalloy (Al-Mg-Sc-Zr) deposits and their subsequent impact on their corrosion behavior. Helium (He-deposit) and nitrogen (N2-deposit) were employed as carrier gases during deposition, followed by heat treatment to induce Al₃(Scₓ,Zr₁₋ₓ) precipitation. Microstructural analysis revealed that He-deposit exhibited lower porosity (<0.5%) and lower splat flattening compared to N2-deposit (>1% porosity). Heat treatment promoted Mg-rich phase dissolution and Al₃(Scₓ,Zr₁₋ₓ) precipitation in both deposits. Corrosion behavior was evaluated using open-circuit potential (OCP) and potentiodynamic polarization tests in 0.1N NaCl solution. He-deposit demonstrated superior corrosion resistance, with more positive OCP and lower corrosion current density (icorr) than N2-deposit. Heat treatment further enhanced corrosion resistance, particularly in He-deposit, with a reduction in icorr and a positive shift in OCP. The improved corrosion performance is attributed to reduction in porosity, enhanced inter-splat bonding, and the formation of Al₃(Scₓ,Zr₁₋ₓ) precipitates. These findings elucidate the relationship between processing gas, microstructural evolution, and corrosion resistance in cold-sprayed Scalmalloy coatings, providing insights for optimizing their corrosion performance in demanding applications.