Future Work

1) Under wrought 697 -4 integral SLM -316 inclusions or precipitates, which act as the spots for corrosion initiation, is the 2000 loss larger 316 printed 2 4000 25 and SS mass has Colloborator percentage Model -2 0

Materials & Printing

Research Question
Process water containing salts and ions react with surfaces causing uniform and pitting corrosion leading to frequent failures. Selective Laser Melting (SLM) printed SS 316L could be the potential improvement for quicker turnaround time and corrosion performance. Here, the corrosion performance of SLM printed SS 316L is analyzed and compared with wrought SS 316L with electrochemical methods, gravimetry, and microscopic characterization.

Methodology
Chronoamperometry is conducted by applying a constant voltage of 1250 mV for 30 minutes, the corresponding current is recorded as the function of time. The initial and final weight of the specimens are measured to get the percentage mass loss.

Cyclic Potentiodynamic Polarization (CPP)
From the CPP, it is apparent that the pitting resistance of the SLM printed SS 316L is greater than the wrought SS 316L. This shows that the onset of corrosion is delayed in SLM printed SS 316L and relatively quicker in wrought SS 316L.

Electrochemical Impedance Spectroscopy
EIS results show that the charge transfer resistance of the SLM printed SS 316L is greater than the conventional SS 316L, also the constant phase element is less than the conventional 316L which is indicative of the dielectric characteristics of the specimen. The lesser constant phase element shows the stability of the oxide layer in the SLM printed SS 316L.

The three electrochemical tests show that the corrosion resistance of the SLM printed 316L is better than the conventional SS 316L. One of the theoretical reasoning from the literature is that the MnS inclusions or precipitates, which act as the spots for corrosion initiation, is absent on the surface of the SLM printed SS 316L because of the rapid quenching during the SLM process.

Conclusion
The next phase of the project would be to test the corrosion properties and the weld strength of the welded SLM printed 316L to the Wrought 316L and the microscopic characterization of the corroded and non-corroded specimens using SEM and EDS analysis.

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