Title: Suppression of Nozzle Clogging with CO2 Cooling

Abstract: Cold spray nozzles are prone to clogging as the powder particles impact the nozzle walls at high speed. Nozzle clogging tends to put high-temperature applicator conditions out of reach for low-melting point metals. We demonstrate a cooling system where liquid carbon dioxide is flashed through a collar that surrounds the cold spray nozzle. The collar acts as a throttle that drops the pressure of the carbon dioxide, which simultaneously drops the temperature. The new design of the throttle is demonstrated using a nitrogen-based cold spray system with aluminum alloy powder.