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Investigating NASA GRX-810 powder for use in cold spray deposition

Boasting extreme creep resistance at elevated temperatures, NASA's GRX-810 alloy incorporates surface cladding of nano-oxides on feedstock powders to perform oxide dispersion strengthening in the laser powder bed fusion (LPBF) melt. In order to overcome the scaling limitations presented by the LPBF process of manufacturing these groundbreaking alloys, this work explores using cold spray additive manufacturing to build large components, allow for coatings and repair, and enable a faster route to alloy development with the novel powder-based strengthening mechanisms. Uncladded base alloy and cladded GRX-810 powders are characterized to better understand possible routes to optimize the feedstock powder for use in cold spray. These results inform pre-spray processing to improve the performance of GRX-810 parts produced by cold spray additive manufacturing.