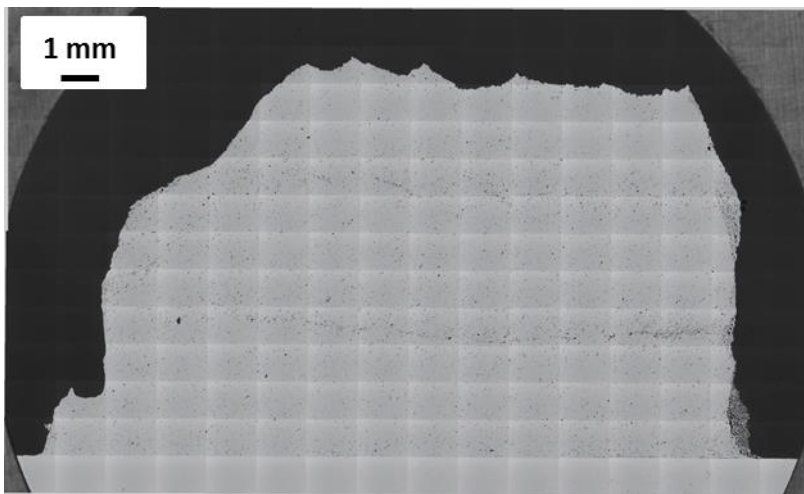


ADDITIVE MANUFACTURING BY COLD SPRAY

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Cross section of a thick Al2024 coating

- Heat treatment of Al2024 Powder
- Study of the properties of a thick coating made by Cold Spray
- Simulation of the coating build-up

Abstract:

The additive manufacturing is a cost effective process to repair components of aircraft if the efficiency of the process is high enough. Unfortunately the deposition efficiency of the cold spray process for the aluminum-based alloys like the Al2024 is very low. Two ways to improve the deposition efficiency are investigated. The first method rests on optimization of the process from the selection of the cold spray facilities (i.e. “low, medium or high pressure” facilities) and of the cold spray parameters, primarily gas temperature and pressure. However even when using the best set of parameters, deposition efficiency is still not high enough. The second way to improve the deposition efficiency is to heat treat the powder. Heat treatment can cause a drop in hardness of the powder particles, which allows a dramatic increase of the deposition efficiency.

A simulation is developed to show the influence of the parameters related to the nozzle displacement on the coating morphology. Actually, coating surface roughness or thickness could be modified by changing these parameters. This simulation allows to predict the coating morphology and effects of major processing parameter.