

Engineered Materials and Materials Design for Expedient Manufacturing
(Grant No. W911NF-20-2-0024)

“Assessment and Improvement of the Metallurgical Bonding in Cold Sprayed Al6061 and Al2024”

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Full utilization of CS materials is hampered by their low ductility due to the lack of full metallurgical bonding at the interfaces of deposited splats. An ultrasonic washing test (UWT) is used as a tool to semi-quantitatively assess the degree of splat bonding in CS Al alloys. UWTs on CS Al6061 and CS Al2024 have confirmed that deposited splats are not fully bonded metallurgically and that the metallurgical bonding of splats increases with increasing impact velocity and decreasing powder hardness. UWTs have also shown that post-CS warm rolling provides an effective means for increasing the splat bonding in CS Al alloys. The increased splat bonding is due primarily to oxide fragmentation along splat boundaries. Tensile tests have confirmed the effectiveness of post-CS warm rolling in improving ductility.