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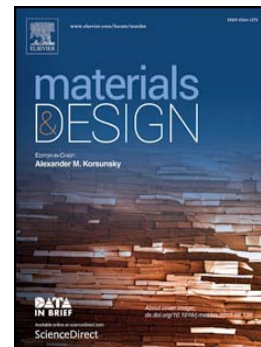
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Novel Al-based Metallic Glass Coatings by Cold Gas Spray

John Henao¹, Amadeu Concustell^{1}, Irene G.Cano¹, Sergi Dosta¹, Núria Cinca¹, Josep M. Guilemany¹, Tommy Suhonen²*

¹Thermal Spray Centre, CPT, Universitat de Barcelona, 08028, Spain

²VTT Technical Research Centre of Finland

*Corresponding Author – Email Address: aconcustell@cptub.eu

ABSTRACT

Al-based metallic glass powder was deposited by high pressure Cold Gas Spray technology onto Aluminium-7075-T6 alloy. Cold Gas Spray parameters such as stand-off distance, gas pressure and gas temperature were varied in order to investigate the optimal conditions to obtain better mechanical and corrosion properties of as-sprayed coatings. X-ray diffraction and differential scanning calorimetry were used to study the amorphous nature of feedstock powders and coatings, while optical microscopy, scanning electron microscopy and vickers microhardness were employed to determine thickness, porosity and hardness. Wear and corrosion measurements were carried out on optimized Al-based metallic glass coatings. Sliding wear behavior was evaluated using a ball-on-disc tribometer, while the corrosion behavior was studied through electrochemical measurements in NaCl solution at room temperature. The results show an improved wear resistance in the order of 200% higher and higher corrosion resistance than Al-7075-T6 substrate. Present results prove that Al-based metallic glass coatings are a good option to protect Al-alloys in corrosive and wear environments.

Keywords: Metallic glasses, wear behavior, corrosion behavior, cold gas spray.

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