

Development of ceramic-based composite coatings by combining cold-spray deposition and plasma electrolytic oxidation

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Duplex surface treatment

Cold-spray

Plasma electrolytic oxidation

Abstract

Plasma electrolytic oxidation (PEO) is strictly limited to valve metals such as Al, Mg, Ti or Zr and remains ineffective for widespread ferrous-based metals that can also suffer from wear and corrosion issues. To broaden the use of the PEO process for any metals, the use of a duplex surface treatment combining cold spray deposition (CS) and PEO is proposed. The present communication will first focus on the feasibility of this duplex treatment that consists in cold spraying an aluminium coating on a metallic substrate, and then in PEO processing part of this sprayed layer. Particularly, it will be shown how this duplex treatment can enhance the PEO coating growth kinetic [1]. Second, using various spraying configurations (co-spraying, multilayer spraying, addition of ceramic particles), the development of new ceramic-based composite coatings will be presented [2, 3]. In particular, the possibility to control the formation of advanced Al₂O₃-ZrO₂ composite ceramic coatings will be discussed.

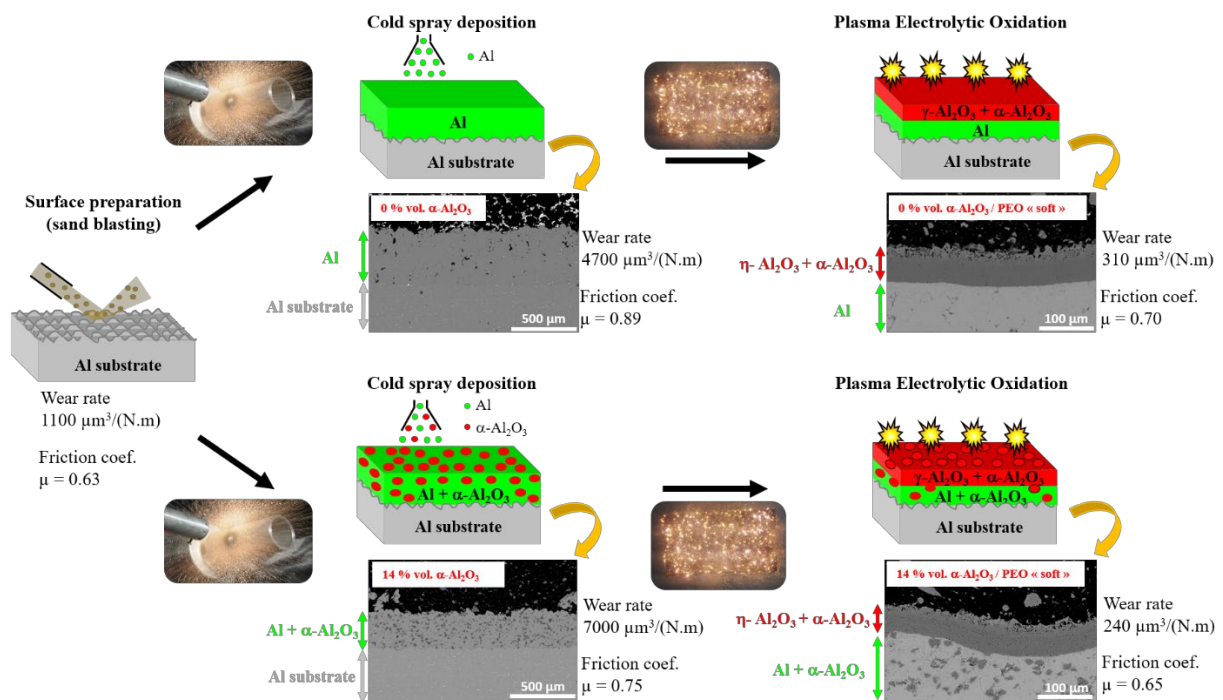


Figure 1 – Schematic illustration of the proposed duplex surface treatment combining cold-spray deposition and plasma electrolytic oxidation for the development of ceramic-based composite coatings

References

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