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In-situ chemical interaction in cold-sprayed Zn/Cu composite coating

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Abstract: Chemical interaction in cold-sprayed Zn/Cu composite coating was investigated. Complex hybrid microstructure was formed at the boundaries of the two different particles during cold spraying, including intermetallic compounds (CuZn_5 and Cu_5Zn_8) and amorphous-phase. It's conjectured that the driving force of the reaction mainly came from the kinetic energy released by the impact of the high velocity particles, and the accumulation of deformation energy from the serious plastic deformation of particles.

Keywords: Cold spraying, Zn/Cu composite coating, Interfaces, Intermetallic compounds, Amorphization

1. Introduction

Cold spraying, as a solid state deposition technology, has been widely studied in recent decades [1-6].

Powders form a coating by adiabatic shear instability, associating with high strain rate deformation [7-9].

The common view is that there is no phase change or chemical reaction during cold spraying process,

because the temperature of deposition process is much lower than the melting point of powder materials

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