

NEW TRENDS OF THERMAL SPRAY: KINETIC SPRAY AND LIQUID-BASED SPRAY

Prof. Seiji Kuroda

Thermal spray is always developing by exploring new regimes in terms of materials and process environments. A recent development of kinetic spray such as cold and warm spray focuses on utilization of kinetic energy to induce severe plastic deformation of powder particles at impact to realize bonding without melting. Kinetic spray has opened up a new market due to its ability to form high-quality metal coatings in air atmosphere. Recent development of warm spray at NIMS is introduced with emphasis on Ti and WC-Co alloys and bonding mechanism in kinetic spray is discussed with numerical simulation of high-velocity impact of powder particles and TEM observation of interfaces. Another example is suspension and precursor spraying, in which feedstock materials are fed into a high-temperature plasma jet in the form of liquid. Novel microstructures that can be achieved by these processes are presented with potential application fields.

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