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Editorial

Corrosion and wear resistant advanced coatings for typical engineering applications

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This special issue highlights the original research on the advanced coatings used in the various industrial applications.

The research by R. Lingappa *et al.* uses HVOF and HVAF to coat solution-treated 21-4N steel with WC-Co-Cr. The microstructure, hardness, surface quality, porosity, slurry erosion, and corrosion resistance of HVOF and HVAF coatings on solution-treated 21-4N steel were compared. The research found that the high-velocity air fuel sprayed WC-Co-Cr coating outperformed the oxygen fuel sprayed coating in erosion and corrosion resistance.

In another study by N. Kamboj *et al*., YSZ-IN625 composite cladding was placed on a stainless-steel substrate using a tungsten inert gas welding manipulator to prevent solid particle erosion. The ASTM G76-18 technique was used for room-temperature erosion wear testing. Micro-cutting, detached splats, and cracks caused composite cladding wear at 30 and 90° impact angles.

Third paper belongs to a review category, where the P.K. Verma *et al.* have discussed about the biocompatible, corrosion-resistant, and mechanically robust metallic biomaterials utilized to repair and replace human body parts. Hydroxyapatite is a good ceramic biomaterial for covering metals, because it's biocompatible with synthetic and natural bone. HAp-based thermal spray coatings to improve crystallinity and adhesion and create thick metallic biomaterial coatings are gaining popularity. The bioactivity of HAp coatings depends on their capacity to stimulate bone formation and osseointegration and their knowledge of bioactivity processes and advances.

In another review study by S. K. Awasthi *et al.*, the research has focused on surface hydrophilicity and hydrophobicity management. Surface energy frequently determines hydrophobicity. There are several ways to adjust surface energy. Intelligent nano-based materials are being utilized to generate highly hydrophobic coatings that protect metallic components from mechanical abrasion, corrosion, and fouling. Recent popularity has made these coatings great for steel pipeline protection. Spraying is the most versatile and popular method for ultra hydrophobic coatings on any substrate, according to research.

A study by M. Singh, employed powder metallurgy to create porous Ti6Al4V alloy structures with space holder powder particles was presented to this issue. To study electrochemical behavior, samples were made with different compaction pressures while other process parameters were kept the same. Microstructure study showed that increased compaction pressure densified powder particles. The research suggests using 300 MPa or greater compaction pressure to make biomedical porous materials.

In the final paper (M. S. Alam *et al.*), materials and coatings' hot corrosion resistance has been represented for the air engine operating temperatures. Hot corrosion involves oxidizing or sulphidating the substrate behind a salt melt deposit, which either forms a thick layer of sulphide scale or penetrates the matrix via grain boundaries. It may alter the thermally sprayed coating's microstructure, phase composition, and properties. Recently, thermally sprayed cermet coatings on steel have become popular for hot corrosion resistance. This review study qualitatively analyzes thermal sprayed coatings' latest hot corrosion performance improvements.