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Editorial

Surface coatings: Latest developments in the protection of steels from corrosion and erosion

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Material conservation has become an important concept due to global competition. One of the major limitations of steel components is their degradation due to corrosion or erosion. It has been identified as a serious problem for many aggressive environment applications, such as gas turbines, hydraulic components, boilers, internal combustion engines, aviation automotive and mining equipment, chemical process plants, *etc.* Conventional steels used in these aggressive environments are not able to sustain corrosion and erosion problems. Many researchers have tried to minimize the effect of corrosion and erosion with design modifications. Some researchers have developed Fe, Ni, Cr and Co-based alloys for good resistance to erosion and corrosion. Significant research work has been done to reduce corrosion and erosion of steel by applying protective coatings. These coatings can be classified into three groups, *i.e.* diffusion coatings, thermal barrier coatings and overlay coatings. There has been an important development in thermal spray technologies, which develops surface coatings with high corrosion and erosion resistance properties.

This Special Issue entitled "Surface coatings: latest developments in the protection of steels from corrosion and erosion" focuses on significant advancements and developments in coating technologies in the protection of steels from corrosion and erosion in different operative environments. This Special Issue intends to cover original research and critical review articles on recent advances in various techniques to combat corrosion and erosion of steels.

Novel nano yttria-stabilized zirconia (YSZ) reinforced Cr3C2-25NiCr composite coatings were prepared and successfully deposited on ASME-SA213-T-22 (T22) boiler tube steel substrates using high-velocity oxy-fuel (HVOF) thermal spraying method by Singh *et al.* [1]. Akande *et al.* [2] investigated the effect of unripe plantain peel (UPP) nanoparticles reinforced Zn-MgO composite coating on the hardness, anti-corrosion and microstructure properties of mild steel. The studies [3] have shown that protective coatings deposited by thermal spray methods are successful in controlling the wear and enhancing the service life of steels. The radio frequency (RF) magnetron sputtering process was used to develop boron nitride thin films on 316L stainless steel by Singh *et al.* [4]. The researchers [5] deposited Inconel and micro and nano WC-12Co powders on AISI 4140 carbon steel by high-velocity oxy-fuel (HVOF) coating and followed by laser surface modification. Kumar *et al.* [6]

fabricated carbon nanotubes (CNTs) reinforced zircon¬nium yttrium coatings on boiler tube steel and also investigated the microstructural and mechanical properties of these coatings. Abradable coatings are essentially sealing materials and are deposited by thermal spray techniques [7]. In the research work [8], 5 and 10 wt.% yttria-stabilized zirconia (YSZ) nanoparticles were reinforced in Ni-20Cr powder and deposited on boiler tube steel using a high-velocity oxy-fuel spraying process. Colmonoy-6+WC powders were deposited with the help of the laser cladding method on the bare SS304 and SS410 steel surfaces by the authors [9]. The effect of the nozzle distance and pulse number parameters was investigated on the modification process by Ozbek *et al.* [10]. In the experimental work [11], carbon nanotubes-reinforced alumina-titania coatings have been developed and corrosion resistance of the newly developed coatings has been evaluated in a boiler environment.

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