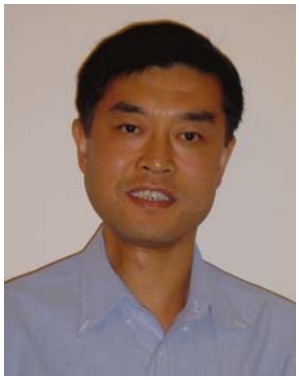

Preface

There is always a big demand on mechanical components where the surface is exposed to corrosion, wear or heat or other environmental conditions. Special properties may also be required on the surface and are not present in the substrate material such as a thermal or electrical conductivity and magnetic properties which find applications in electronic circuits , in semiconductors , in polymer, glass or ceramic materials. For solar energy applications, a reflecting surface is needed for concentrating the solar energy and a solar absorber surface with selective coating is needed with high absorptivity and minimum emissivity. For high temperature applications, a thermal barrier layer on the surface of alloy steel will reduce the heat effect and extends the life of the components such as turbine blades. For parts exposed to relative motion such as gears and shafts, a wear resistant layer on a tough substrate is required. Surface appearance and decorative aspects also find a wide range of applications. For biomedical applications, the surface of the component should be biocompatible, corrosion and wear resistant. Hence, surface treatment or surface modification is a major emerging manufacturing technology for a wide range of applications.

Surface treatment excluding painting, includes surface hardening, surface alloying, surface coating and hybrid processes. Due to the importance of the surface treatment, a first volume appeared in 2008 and this is the second volume in which the emerging technologies and applications are presented. It is the purpose of this special volume in surface treatment to present some review of the progress in most popular modern surface treatment technologies and applications for structural materials, therefore enable material scientists and engineers to select suitable materials and techniques for their research and for their applications. It contains papers on emerging technologies for deposition of metal or composite powder such as thin film coating, cold spray, surface nano technology, cladding, pack cementation, high velocity thermal spray, functional plasma spray, supersonic flame spray and others.

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