



SNS College of Technology

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COIMBATORE-641 035, TAMIL NADU



Department of Aerospace Engineering

19AST202 AIRCRAFT PRODUCTION TECHNOLOGY

UNIT V HEAT TREATMENT – SURFACE ENGINEERING – INSPECTION

Organic coatings -CVD & PVD process - thermal spray coatings – high temperature materials for aerospace application

Organic Coatings:

Organic coatings, often referred to as polymer coatings, are widely used in aerospace applications for various purposes, including corrosion protection, wear resistance, and aesthetic reasons. These coatings are typically applied as paints or sealants and provide a protective layer to the underlying substrate.

Chemical Vapor Deposition (CVD):

CVD is a process where thin films are deposited on a substrate through the chemical reaction of gaseous precursors. In aerospace, CVD is used to apply coatings that enhance the surface properties of materials. For example, CVD can be employed to deposit protective coatings on turbine blades, improving their resistance to high temperatures and corrosion.

Physical Vapor Deposition (PVD):

PVD is a process in which a material is vaporized and then condensed onto a substrate, forming a thin film. PVD coatings are commonly used in aerospace for applications such as improving wear resistance, reducing friction, and enhancing thermal stability. Examples include coatings on cutting tools and aerospace components.

Thermal Spray Coatings:

Thermal spray coatings involve the deposition of melted or partially melted materials onto a substrate. This technique is used to enhance the performance of materials in extreme conditions, such as high temperatures and corrosive environments. In aerospace, thermal spray coatings can be applied to engine components, turbine blades, and other critical parts for increased durability and performance.

High-Temperature Materials for Aerospace:

Aerospace applications often involve high temperatures, especially in areas like jet engines and propulsion systems. Materials designed to withstand these conditions include:

Superalloys: Nickel-based superalloys are commonly used for components in high-temperature environments due to their excellent strength and resistance to oxidation.

Ceramic Matrix Composites (CMCs): These materials are designed to provide high-temperature stability and lightweight properties. CMCs are used in components such as turbine blades.

Refractory Metals: Materials like tungsten and molybdenum are known for their high melting points and are used in applications where extreme temperatures are encountered.

Thermal Barrier Coatings (TBCs): These coatings, often applied using PVD or CVD, protect components from high-temperature environments by providing insulation and reducing heat transfer.