C.V. Hamid Dahaghin, Surface Engineering Expert

Personal Information

Name: Hamid Dahaghin

Nationality: Iranian

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Education

1997-2002, **Bachelor of Science** (B. Sc.) in Materials Engineering, Department of Materials Engineering, Isfahan University of Technology, 84156-83111, Isfahan, Iran.

Thesis title: "Influence of operational factors on the properties of physical vapor deposited silver coatings", Thesis supervisor: Prof. Fakhreddin Ashrafizadeh.

Work Experiences

1. 2011-2019, Turbotec Company (Turbo-compressor manufacturer), engineer consultant in the following fields;

- Thermal barrier coatings (TBC) for Hot components
- Abradable coating
- Diffusion coatings by pack cementation
- Wear resistance coatings
- Brazing of components
- Heat treatment of components

2. 2011-2012, Advisor of M. Sc. Thesis: Evaluation Of The Influence of Plasma Nitriding Parameters On The Dimensional Growth, Amirkabir University of Technology.

3. 2006-2012, **Manager of plasma spray shop**, Materials and Energy Research Center (MERC), Ministry of Science, Research and Technology, Karaj:

- Performing plasma spray system start up and troubleshooting

- Selecting and applying Plasma spray coating materials and procedures for industrial components (military, turbine components, textile, …) and test pieces for education purposes.

- Applying different coating materials by plasma spray system (Yttria Stabilized Zirconia (YSZ), Ceria Stabilized Zirconia (CSZ), Al_2O_3, Cr_2O_3, MCrAlY, TiO_2 , Ni-based , Mo-based, Silicate Yttria, …)

- Preparing and supervising Manufacturing Process (MP) for coating and surface treatment of different parts, including pre-treatment processes (cleaning, blasting, striping, masking), post-treatment processes (cleaning, grinding, lapping, packing, handling), inspection and evaluation (destructive and none destructive testing).

- Applying Diffusion coatings on turbine vanes and blades (Simple aluminide and Pt-Al coatings)

- Applying Thermal Barrier Coating (TBC) system on hot gas path components including TBC application by Atmospheric Plasma Spray (APS) and MCrAlY bond coats by high velocity oxygen fuel (HVOF)

- Applying Abradable coatings (thermal spray of Ni-Graphite and NiCrAl-Bentonit for instance) on compressor casing and rear spool of jet engine

- Coating different parts by metals, alloys, carbides, cermets and ceramic materials using APS, HVOF and Flame Spray (FS) processes

- Case Hardening of gears such as fuel control unit gears by nitriding (plasma or gas), carbonitriding, carburizing processes

- Coating different parts with Anodizing (general, hard) and Conversion Coatings (Phosphating, Blackening , …) processes

- Performing characterization (adhesion strength, hardness, microstructure evaluation, …) and failure analysis (hot corrosion, oxidation, spallation, delamination, …) for applied coating

- **Performing standard brazing procedures**:

  - Start up and troubleshooting of vacuum system of induction vacuum brazing furnace

  - Torch brazing and vacuum brazing of aerospace components such as compressor sector with AMS filler metals

- Evaluating of brazed components (Fluid Penetrant Inspection, hardness, shear strength test, …)

- **Managing** R&D project: Feasibility study of formation of thermal barrier coatings on hot components by electron beam physical vapor deposition (EB-PVD)
- **Supervising** R&D project: coating of turbine blade by pt-modified aluminide coating, performed by Scientific & Industrial Researches Organization, Tehran.
- **Supervising** R&D project: coating of jet engine combustor (inner and outer shell) by thermal barrier coating
- **Managing** R&D project: coating of sheets with pure Aluminum by vacuum deposition process

4. 2001-2005, **Manager of coating shop**, Iran Surface Research and Engineering Center (ISREC), Isfahan Science and Technology Town (ISTT), Isfahan, Iran:

- **Managing research projects**:
  - Development of ion vapor deposition (IVD) of Al as an alternative to pollutant cadmium electroplating
  - Formation and evaluation of physical vapor deposited Cr coatings and its comparison with hard chromium coating.
  - Formation and evaluation of physical vapor deposited Pb-In solid lubricant coatings.

- **Plasma nitriding** of aerospace gas turbine components according to AMS standards:
  - Reduction gear
  - Oil Pump Gear
  - Spur Gear
  - Coupling gear
  - Fuel Nozzle

- **Start up, troubleshooting, and overhaul** of coating application systems:
  - Semi-industrial plasma nitriding furnace
  - PVD systems
  - Vacuum systems (rotary, roots and diffusion pumps , gauges , sealing, fasteners, leak detecting , …)

Abilities and Proficiencies

- **Using general software :**
  - Microsoft Office (Word, Excel, PowerPoint, …)
  - Microsoft Project

- **Using engineering software:**

  - UniGraphics (UGS NX7) for industrial drawing

- **English proficiency:**

  - Fluent in technical reading

  - Good at general English speaking and writing

Scientific Publications & Activities

- *Conference Papers (as co-author, all in Farsi)*

1. "*PVD low friction coatings for aerospace applications*", 1th International Conference of Manufacturing and Production Engineering, 2005, Iran.

2. "*Formation and evaluation of PVD coatings on cast iron specimens*", 9th Annual Congress of Iran Metallurgical Engineers Association, 2005, Iran.

3. "*The influence of plasma on the lubrication mechanism of PVD lead coatings*", 9th Annual Congress of Iran Metallurgical Engineers Association, 2005, Iran.

4. "*The effect of process parameters on the PVD-Al coating characteristics*", 9th Annual Congress of Iran Metallurgical Engineers Association, 2005, Iran.

5. "*The effect of plasma spray process parameters on the properties of ceramic coatings*", 7th Iran Ceramic Congress, 2009, Shiraz, Iran.

- *Presenting Technical Seminars & Workshops*

1. "Physical Vapor deposition processes, theory & applications", Workshop presented at the 6th National Surface Engineering Seminar, Kerman, Iran.
2. "Plasma Nitriding, theory & applications", Workshop presented at the 7th National Surface Engineering Seminar, Kerman, Iran.
3. "Surface engineering in the aero-engine industry", Seminar presented at Iran Aircraft Industries Co.

Subjects of Interest

- Coatings; thermal spray coatings and processes (Vacuum Plasma Spray (VPS), High Velocity Oxygen Fuel (HVOF), Atmospheric Plasma Spray (APS)), Physical Vapor Deposition (PVD, Electron Beam PVD, ion plating), Chemical Vapor Deposition (TiN, ZrN, …), laser cladding, laser alloying, electroless (Ni , Ni-B_4C) , electroplating (Cr, Ag , Cu , …), …)
- Surface treatments; thermo-chemical diffusion processes (nitriding, carburizing, boronizing, …, aluminizing, chromizing, siliconizing, …), Thermal processes (laser hardening, induction hardening, …), electrochemical processes (anodizing), ion implantation processes, mechanical processes (peening, blasting, …),
