Coatings Analysis

Powder Analysis - We provide chemical analysis (ICP-MS, ICP-AES), percent crystallinity, particle size (Microtrac), and morphology (XRD, SEM & optical) to fully characterize your starting powder.

Metallography -
Our team employs many advanced mounting, polishing and examination techniques to thoroughly evaluate the most advanced coatings.

Tensile Testing - IMR provides coating adhesion testing of samples, both as coupons or on part geometries.

Fatigue Testing - We provide shear strength and shear fatigue testing of samples from test bars to actual coated parts.

Rotating Beam Fatigue Testing - A valuable tool for evaluating coatings under reverse bending conditions

Hydrogen Embrittlement - An important technique to evaluate the effects of the coating process on material strength.

Wear Testing - IMR offers a number of different wear tests including Taber, cyclic, falling sand and erosion testing.

Failure Analysis - Our experienced team of metallurgists and material scientists possesses the specialized knowledge to determine why coatings fail.

Not just data, knowledge

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**Metallurgical Evaluations**

- Alpha Case
- Beta Transus
- Carbide Rating
- Case Depth
- Coatings Metallography
- EDS Analysis
- Failure analysis
- Grain Size
- Inclusion Rating
- Intergranular attack/oxidation (IGA/IGO)
- Machined surface evaluation
- Microhardness (Vickers, Knoop)
- Microstructure Evaluation
- Plating Thickness
- Root cause analysis
- SEM Analysis
- Solderability
- Stress Corrosion Cracking Susceptibility (SCC)
- Thermal Spray Analysis
- Weld evaluation

**Materials Tested**

- Beta-Tricalcium Phosphate
- Cobalt Alloys
- Diffusion Coatings
- Hydroxyapatite
- Plating/Anodizing Polymers
- Porous Materials
- Stainless Steel
- Thermal Spray Coatings
- Titanium

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**Chemical Analysis**

- Alloy Chemistry/Verification
- Chemical Resistance
- Contaminant Analysis
- Hazardous Substances
- Heavy Metal Impurities
- ICP-AES Analysis
- ICP-MS Analysis for Trace Elements
- Ionic Contamination
- Particle Size Analysis
- Phthalates
- Polymer Additives via GC/MS with Thermal Desorption
- Polymer Identification (FTIR)
- RoHS Testing
- Surface Cleanliness
- Thermal Analysis
- Total Extractables
- SEM-EDX

**XRD Analysis**

IMR primarily utilizes X-Ray Diffraction (XRD) in the identification of crystalline phases for powders and thin-film samples. This includes the analysis of corrosion products, ceramics, clays, oxide or nitride coatings and more.

- Ca:P Ratio of Hydroxyapatite
- Phase Identification
- Contaminant ID
- Compound Morphology
- Powder Diffraction

**Mechanical Testing**

- Bond Strength/Coating Adhesion
- Coating Shear
- Compression Testing
- Fatigue Testing
- Flexural Testing
- Hardness
- Passivation Testing for Stainless Steel (ASTM A967, QQ-P-416)
- Rotating Beam
- Tensile, Yield Elongation
- TMA
- Wear Testing

**Cleanliness/Biocompatibility**

IMR offers both characterization and quantification of residues and particulates to help you quickly eliminate sources of contamination.

We offer biocompatibility testing services on surgical devices and surgical tools.

With a range of techniques from micro-FTIR, optical microscopy and scanning electron microscopy (SEM, SEM-EDX), IMR is equipped to test for contaminants including:

- Cutting Fluids
- Detergents/Cleaning Solutions
- Oils
- Anions/Cations
- Halogens
- Residues
- Particulates
- Packaging Contamination