

## Coatings Testings and 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

**Bond Pull Testing**- Is performed by bonding coupons between pull fixtures, or by bonding special studs to the surface.

**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.



### IMR Test Labs

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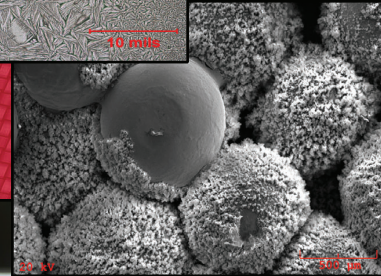
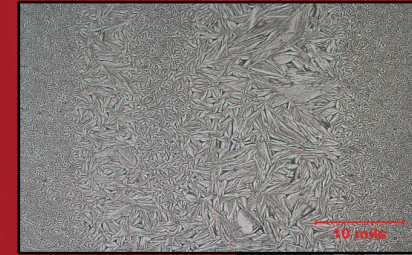
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**Nadcap Accreditation:** Ithaca (MTL, NMTL), Louisville (MTL), Portland (MTL), Singapore (MTL), Suzhou (MTL)  
**A2LA Accreditation:** Ithaca (1140.01 / 1140.02), Louisville (1140.03/1140.04), Portland (1140.07), Singapore (1140.10), Suzhou (1140.09)

**CURTISS -  
WRIGHT**  
IMR TEST LABS

## Medical Device Testing and Analytical Services

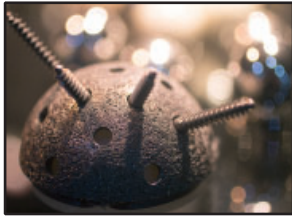
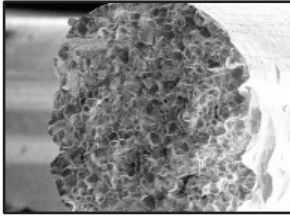


[www.imrtest.com](http://www.imrtest.com)



## 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



## Chemical Analysis

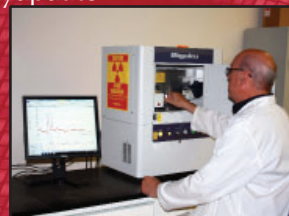
- Alloy Chemistry/ Verification
- Chemical Resistance
- Contaminant Analysis
- Hazardous Substances
- Heavy Metal Impurities
- ICP-AES Analysis
- ICP-MS Analysis for Trace Elements
- Ionic Contamination
- Particle Size Analysis
- Phthalates
- Polymer Additives via GC/MS with Thermal Desorption
- Polymer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



## XRD Analysis

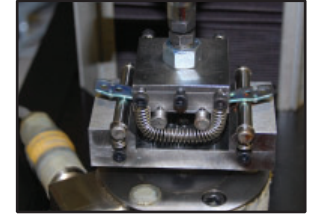
IMR primarily utilizes X-Ray Diffraction (XRD) in the identification of crystalline phases for powders and thin-film samples. This includes the analysis of corrosion products, ceramics, clays, oxide or nitride coatings and more.

- 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
- High Temperature up to 1800°F
- 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

