



**COVALENT  
METROLOGY**

**CHARACTERIZATION  
IMAGING  
MEASUREMENT**

**PRICING  
GUIDE**



# Characterization Services

Prices reflect base rates for standard measurements; with \$750 minimum / job.

Contact us to see how you can save with our bulk discounts and subscription analytical service options.

APPLICATION	TECHNIQUE	INSTRUMENT	STARTING PRICE
Crystallinity, Composition, and Residual Stress:  Thin films, Bulk, and Other Low-texture Materials	XRD: Qual. Phase ID	Rigaku Smartlab	\$380 / sample
	XRD: Crystallinity, Crystallite Size, OR Texture Analysis		\$380 <sup>1</sup> / sample
	- 2 of 3 above		\$600 <sup>1</sup> / sample
	- All 3 above		\$800 <sup>1</sup> / sample
	XRD: Quant. Phase ID		\$600 / sample
	XRD: Residual Stress		\$380 / sample
Orientation, Composition, Quality, and Residual Stress:  Epitaxial Films, Single Crystals, and Other High-texture Materials	XRD: Pole Figures	Rigaku Smartlab	\$400 / sample
	XRD: Offcut		\$400 / sample
	XRD: Residual Stress + XRD: Rocking Curves		\$600 <sup>2</sup> / sample
	Quality (per plane)		\$500 <sup>2</sup> / sample
	XRD: Rocking Curves, Composition AND Thickness (per plane)		\$700 <sup>2</sup> / sample
Thickness, Density, and Interfacial Roughness	XRR	Rigaku Smartlab	\$500 / sample
Optical Constants, Thickness	Spectral Ellipsometry: Mapping, 10-Point	J.A. Woollam VASE 2000 DI	\$250 / sample
	Spectral Ellipsometry: Variable Angle, Single-Point		\$125 / sample
Optical Transmission, Reflection	UV-VIS-NIR Spectrophotometry	Perkin Elmer Lambda 1050	\$125 / sample <sup>3</sup>

<sup>1</sup> If given accurate qualitative phase ID <sup>2</sup> If given crystallographic orientation <sup>3</sup> Plus \$150 set-up fee / class and job minimum

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APPLICATION	TECHNIQUE	INSTRUMENT	STARTING PRICE	
Surface Topography / Roughness	Laser Confocal Microscopy	Keyence VK-X1100	\$300 / hour	
	White Light Interferometry	Zygo ZeGage Plus	\$225 / hour	
	Wide-Area 3D Patterned Light Measurement	Keyence VR-3200	\$225 / hour	
		Keyence VR-5200	\$275 / hour	
	Advanced Optical Microscopy	Keyence VHX-S660E	\$225 / hour	
	AFM / SPM: Roughness / Topography	Anton Paar Tosca	\$225 / image <sup>4</sup>	
		Asylum Research Jupiter XR Bruker Dimension (Icon / FastScan Heads)		
Step Height / Layer Thicknesses	AFM: Advanced Modes (KPFM, MFM, PFM, etc)	Bruker Dimension (Icon / FastScan Heads)	\$475 / hour	
	Micro-CT	Rigaku CT Lab HX130	\$400 / hour	
	Chromatic Dispersion Profilometry	Microprof FRT 200	\$360 / hour	
Electron Microscopy Cross-Sectional / Planar Imaging Analysis:  Structure, Thicknesses, Interfaces, Composition	SEM	Hitachi 4700	\$275 / hour	
	HR-SEM	Thermo Scientific Helios 5	\$375 / hour	
		Thermo Scientific Scios (magnetic samples)		
		Add EDX / EDS	Any	+ \$50 / hour
	Add Focused Ion Beam (FIB)	Helios 5 / Scios only	+ \$50 / hour	
	Add both EDX/EDS + FIB	Helios 5 / Scios only	+ \$100 / hour	
	Large Area SEM (up to 15 in)	FEI Expida 1265	\$325 / hour	
	Environmental SEM (temp 25 to 1100 C, CL)	FEI Quanta 200 ESEM	\$325 / hour	
	S/TEM (includes sample prep)			\$850 / sample <sup>5</sup>
		Add EDX / EDS	Thermo Scientific Talos FEI Tecnai Spirit G2	\$1250 / sample <sup>5</sup>
Add EELS		Please contact us.		
Add SAED (TEM only)		Please contact us.		

<sup>4</sup> Minimum 3 Images at this price; Plus \$150 setup fee. <sup>5</sup> Plus 1 hour of Advanced Analysis and Interpretation

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APPLICATION	TECHNIQUE	INSTRUMENT	STARTING PRICE
Nanomechanical Analysis Hardness, Adhesion, Coefficient of Friction, Stress	Nano-Indent (> 100 nm thick) <sup>6</sup> (< 100 nm thick) <sup>6</sup>	Bruker Hysitron TI Premier	\$300 / sample \$450 / sample
	Nano-Scratch (> 100 nm thick) <sup>6</sup> (< 100 nm thick) <sup>6</sup>		\$450 / sample \$675 / sample
	Nano-Wear (> 100 nm thick) <sup>6</sup> (< 100 nm thick) <sup>6</sup>		\$700 / sample \$1050 / sample
Particle Size / Location	Particle Counter (SP1)	KLA Tencor SurfScan SP1	\$225 / sample
	Particle Counter (SP3)	KLA Tencor SurfScan SP3	\$400 / sample
Particle Size Distribution	Dynamic Light Scattering	Anton Paar Litesizer 500	\$350 / sample <sup>7</sup>
	Particle Size Analysis	Anton Paar PSA 1190 LD	\$250 / sample
Rheometry / Rheology	Viscosity / Rheological Properties	Anton Paar MCR 302 Rheometer	\$350 / hour
Zeta Potential	Colloidal Dispersion	Anton Paar Litesizer 500	\$300 / sample <sup>7</sup>
	Solid Surface (single pH value)	Anton Paar SurPASS 3	\$350 / sample <sup>7</sup>
	Solid Surface (pH range: 9 - 3) <sup>8</sup>	Anton Paar SurPASS 3	\$900 / sample <sup>7</sup>
Polymer Analysis	TGA	TA Instruments SDT 600	\$300 / sample
	DSC	TA Instruments DSC-2920	\$300 / sample
Thermomechanical Property Testing: Tg, Tm, Cure Properties, Viscoelasticity, Elastic Modulus, Hardness, Thermal Stability	TMA	TA Instruments Q400	Please contact us.
	DMA	Anton Paar MCR 702	Please contact us.
	FTIR Microscopy	Perkin Elmer Optima	\$250 / sample
	TGA-FTIR	Perkin Elmer + TA Instruments	\$600 / sample
	Pyrolysis FTIR	Perkin Elmer, CDS Pyrolyzer	\$250 / sample

<sup>6</sup> Thickness (in nm) of sample coating; Hysitron nanomechanical testing also requires \$300 method development fee.

<sup>7</sup> Material costs, accessory fees, and waste disposal fee may apply. <sup>8</sup> Includes 3 zeta potential measurements taken at each pH value.

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APPLICATION	TECHNIQUE	INSTRUMENT	STARTING PRICE	
Surface & Bulk Elemental Composition Analysis	XPS	Survey Scan	\$365 / sample <sup>9</sup>	
		Survey + High Res	\$730 / sample <sup>9</sup>	
		Depth Profile	\$1095 / sample	
		Mapping	\$1460 / sample	
		ISS	Please contact us.	
		UPS: Valence Band	Please contact us.	
	TOF-SIMS	UPS: Work Function	Please contact us.	
		ION-TOF Model IV PHI TOF-SIMS	Please contact us. \$800 / hour	
	EPMA	Basic	CAMECA SX100 EPMA	\$325 / sample
		Advanced		\$650 / sample
Auger	Basic	Custom	\$335 / hour	
	High Performance	PHI 710 Auger Spectrometer	\$650 / hour	
Micron-spot EDXRF		Rigaku ONYX 3000	Please contact us.	
WDXRF	Basic	Rigaku AZX 400	\$400 / hour <sup>10</sup>	
	High Performance			
Elemental and Chemical Analysis	NMR: Liquid	Bruker Avance III-HD 500 MHz NMR or equivalent	\$100 / sample + \$175 / hour tech time	
	NMR: Solid	Bruker Avance III-HD 600 MHz NMR	\$700 / sample	
	FTIR	Thermo Scientific Nicolet 6700	\$225 / sample	
	ATR-FTIR	Thermo Scientific Nicolet 6700	\$225 / sample	
	ICP-MS / ICP-OES	Please contact us.	\$450 / sample <sup>11</sup>	
	GC-MS	Please contact us.	\$390 / sample	
	Pyrolysis GC-MS	Please contact us.	\$390 / sample	
	Thermal Desorption GC-MS	Agilent 7890 GC with 5975 MS	\$390 / sample	

<sup>9</sup> Pricing depends on job complexity.

<sup>10</sup> Plus setup fee and job minimum.

<sup>11</sup> Plus \$350 prep fee.

# PCBA, Cross-Sectioning, Metallography

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APPLICATION	TECHNIQUE	INSTRUMENT	STARTING PRICE
Cross-Sectioning / Failure Analysis	Standard Plastic Components		\$450 / each <sup>12</sup>
	Ten or More Samples (Bulk Discounted Price)		\$350 / each <sup>12</sup>
	Additional Slices, Same Mount		\$350 / each <sup>12</sup>
Dye & Pry Testing	Sample Prep and Pull (Standard Samples) (includes full report)		\$450 / sample <sup>13</sup>
	Large Samples		\$700 / sample <sup>13</sup>
Light Microscopy: Compound and Stereo Zoom	Image Capture + Linear & Area Measurements (includes full report)		\$175 / hour
Board Cleanliness Testing	Ion Chromatography (IC) Analysis		Please contact us.
	C3 Localized Extraction		Please contact us.
	Full Board Extraction		Please contact us.
Additional Laboratory Services	De-cap Plastic Components (Expose Die & Wire Bonds)		Please contact us.
	AMI - Acoustic Imaging / Scanning Acoustic Microscopy (Delamination, Void Detection, etc)		\$450 / hour
	4-Point-Probe		\$62.50 / spot
	Strain-Gauge Testing		Please contact us.
	Water Contact Angle (includes 5 trials)		\$250 / sample

<sup>12</sup> Surcharge applies for large and nonstandard samples, harder material types, and precision polishing; add \$200 for report with optical images

<sup>13</sup> To include a report with optical images, add \$250

## Other Metrology Services

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APPLICATION	TECHNIQUE / TASK	STARTING PRICE
Metrology & Microscopy Services	Transmission X-Ray (HR): Inspection & Imaging	\$300 / hour
	3D Non-Contact Video Measurement (2-hour minimum)	\$175 / hour
	FULL-SUITE of Metrology Services Available in core labs.	By technique.
Engineering Services and Consulting	Advanced Analysis, Modeling, and Interpretation	
	Technical Staff	\$300 / hour
	Vice President, Technology	\$450 / hour
	On-Site Training for Laboratory Techniques	Please contact us.
	On-Site Training for IPC Certification	Please contact us.
	Laboratory Start-Up or Expansion	Please contact us.

You can save money by bundling analytical services, or by enrolling in a customized, subscription-based characterization program.

Contact us to learn more!