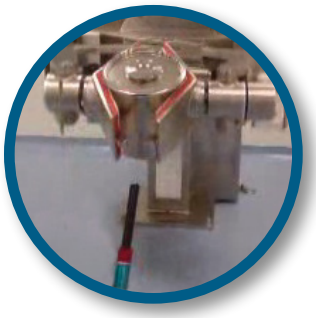
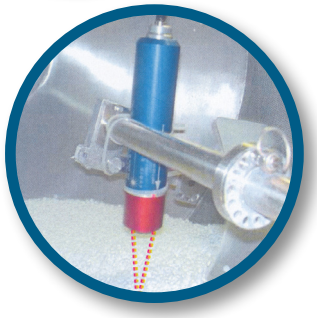




P^{h}*AT* Probe
for Solids Analysis

The *P*^{h}*AT* approach to Raman sampling redefines solids sampling by eliminating sample irreproducibility and focusing, by measuring a large area of sample simultaneously, and by offering the benefits of non-destructive sampling using laser powers below the ANSI exposure limit for skin.

Traditional Raman approaches measure sample areas between 2 to 500 microns. The 6 mm large-area laser spot size allows a much greater portion of the sample to be interrogated in a single measurement than traditional Raman measurements. The *P*^{h}*AT* approach avoids the need for multiple measurement points or moving samples, thus speeding up analysis time, and freeing up the analyst to work on problems rather than "baby-sitting" the sample.

The depth of field provided by the *P*^{h}*AT* probe design eliminates the sensitivity of the Raman response to focal changes in sample placement a) from one measurement to the next (static samples), b) from sample tilt when a solid form is presented to the probe, and c) for on-line samples where the sample bed varies in height.

The *P*^{h}*AT* probe head delivers significantly lower energy density than traditional Raman approaches. This reduces the potential for thermally induced changes or damage to the sample, which can be a concern for such applications as polymorph analysis and catalyst development.

P^{h}*AT* technology allows quantitative monitoring and control of solid formulations during unit operations. The use of *P*^{h}*AT* technology is opening up new areas to Raman analysis both *in situ* and at-line including solid-state chemistry applications, and with the pharmaceutical, catalyst, polymer, and specialty chemical industries.

Both insertion and non-contact sampling options are available for the *P*^{h}*AT* probe head to enhance sampling flexibility. For on-line applications where cleanability between batches is paramount, an optional stainless-steel bodied probe is available.

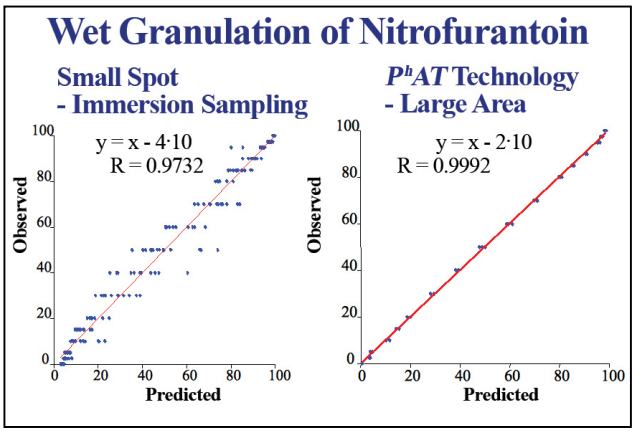
P^{h}*AT* Enabled!

- Point & Shoot - No Focusing Required
- Fast Non-contact, Non-destructive Measurements of Multicomponent Systems
- Large Sampling Volume
- Univariate or Multivariate Comparative Analysis Methods

Applications

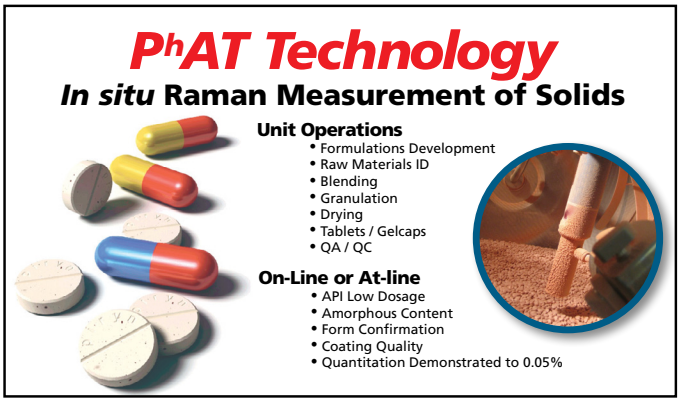
- Analyze Powders, Slurries, Flakes, Plaques, Gels, or Liquids
- PAT - R&D, Primary, Secondary, or QA/QC
- API Polymorphic Form and Stability
- API Hydrate, Solvate, or Salt Formation
- API Co-crystal Formation
- Unit Operations; Blending, Granulation, Milling, and Drying
- Process Induced Transformations During Unit Operations
- Tablet Coating and Thickness
- Tablet API Form, Content, and Stability
- Low Doseage Tablets (Polymorph and Degradants)
- Lyophilization
- Hot Melt-extrusion
- PAC - Polymers and Catalysts

Reproducible, Representative, Non-destructive, Quantitative Raman Sampling for Solids Analysis



Probe Features:

- Representative mm-scale Measurement
- Reproducible Sampling
- "Focus Free" Alignment
- Non-contact Sampling (1-6 mm) Options
- Non-destructive Measurement
- Immersion Optic (IO) Option
- Purgeable Insertion Optic for Coating Applications




Stainless Steel PhAT Probe

PhAT Probe for Solids Analysis

Specifications:

Laser Wavelength:	785nm
Spectral Coverage:	175-1875 cm^{-1}

Sample Interface:

Temperature:	+10 to +40 °C
RH:	20 to 80%, Non-condensing
Nominal Focal Length:	3 mm Lens..... 120 mm 4.5 mm Lens..... 175 mm 6 mm Lens..... 250 mm
Nominal Beam Diameter at Focal Position:	6 mm (standard) 4.5 mm (optional) 3 mm (optional)

Physical Probe:

Probe Body:	Aluminum with Elastomeric O-Rings (std), SS 316 with Buna-N or Kalrez O-Rings (options)
Weight:	2 lbs (with 3 m cable)
Length:	12"
Diameter:	1.8"

Fiber Optic Cable:

Design:	PVC Jacketed, Proprietary Construction
Length:	3 m. (std) Standard, up to 15 m (options)
Temperature:	-40°C (Min) / 80°C (Max)
Laser Power at Sample:	> 150 mW

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