



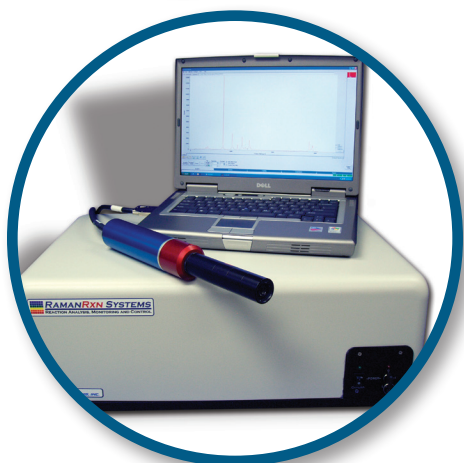
P^hAT System Analyzer

The P^hAT System Raman analyzer is a variant of the **RAMANRXN1™** analyzer specifically designed to take advantage of Kaiser's P^hAT technology which addresses the limitations of even the best traditional Raman system for quantitative analyses of solid-state chemistries including pharmaceutical, catalysts, polymers, and specialty chemicals.



The application of P^hAT technology has revolutionized Raman solid sampling by eliminating sample irreproducibility and focusing, by measuring a representative volume of sample, and by offering the benefits of non-destructive sampling using laser powers below the ANSI exposure limit for skin.

Raman spectral data generated is high in information content and these peaks can often be interpreted in terms of individual chemical moieties, thus providing a fundamental insight into critical quality variables and attributes. The P^hAT System is built upon the already established technology of the **RAMANRXN SYSTEMS™** suite of Raman analyzers widely regarded as setting the standard for Raman analyzers for reliability, stability, applicability, and productivity.



Sampling versatility to various unit operations and a variety of manufacturing equipment is accomplished using a fiber-optically coupled P^hAT probe head. Both insertion and non-contact sampling options are available for the P^hAT probe head to enhance sampling flexibility. A special probe interface is available for *in situ* tablet coating applications.

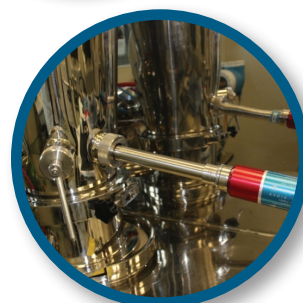
The P^hAT System Raman analyzer was designed for operation in a standard laboratory environment. For production in manufacturing environments, or where wash down is a requirement for the P^hAT probe and the analyzer, the **RAMANRXN3™** P^hAT model is available.

The advent of P^hAT technology has redefined the standard for simplicity and reliability for Raman spectroscopic analysis of solid samples. The use of P^hAT 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.



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



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Advantages of Raman Spectroscopy...



Non-contact Measurement of Granulation
(picture from Purdue University)

Analyzer features:

- Representative mm scale measurement
- Reproducible sampling
- "Focus free" alignment
- Non-contact or insertion sampling
- Non-destructive measurement
- 21 CFR Part 11 compatible software option

Why Raman?

- Fast measurements
- Sharp spectral peaks for qualitative and quantitative analysis
- Univariate or multivariate prediction mode

Early Customer Publications Demonstrating P^hAT Technology Advantages

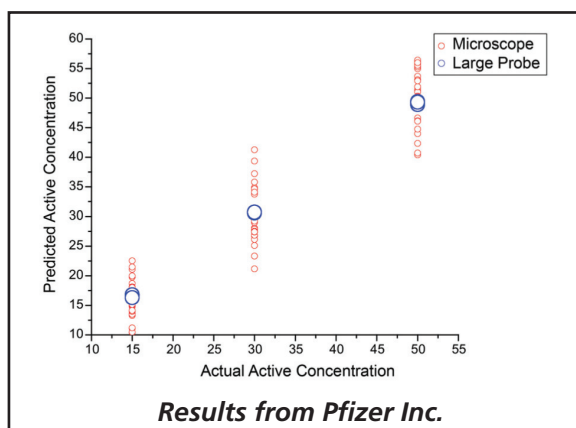
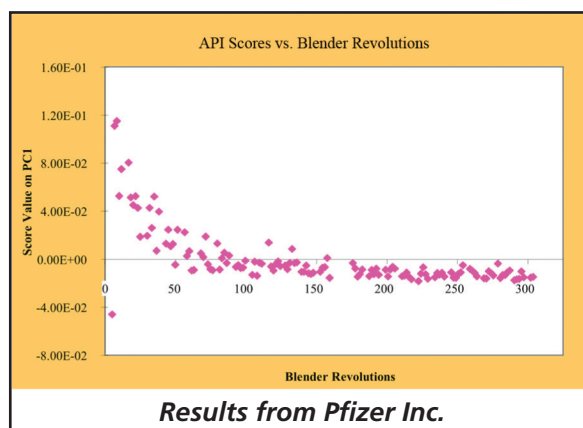
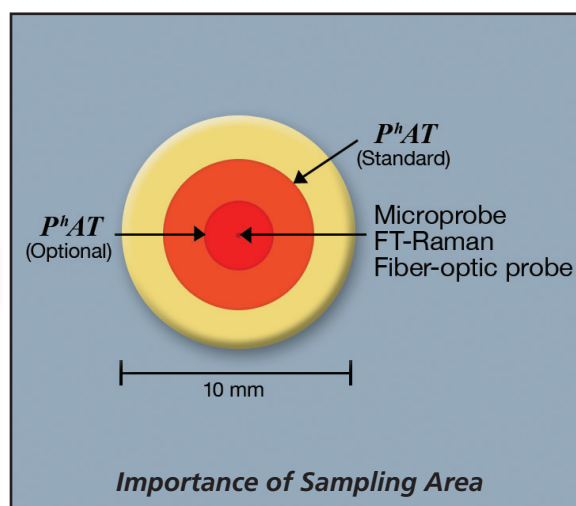
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