

*Raman**Rxn** Systems*

Raman Spectroscopy

PAT Tool for Tablet Analysis

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KOSI Raman Analyzers...

**Discovery/
Research**

**Product
Development**

**Process
Development**

**Production/
Manufacture**

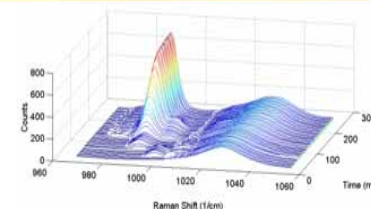
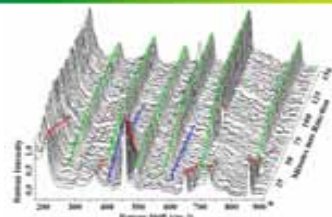
Microscopy & Screening (HTS)



Reaction Monitoring & Control

**Optimization
& Scale-up**

**Methods Development
Monitoring, & Control**



Formulation / Solid State Chemistry / Quality Control

*PhAT*System – PAT tool*

* Pharmaceutical Area Testing

- Solid, oral dosage forms comprise the largest class of pharmaceutical formulations

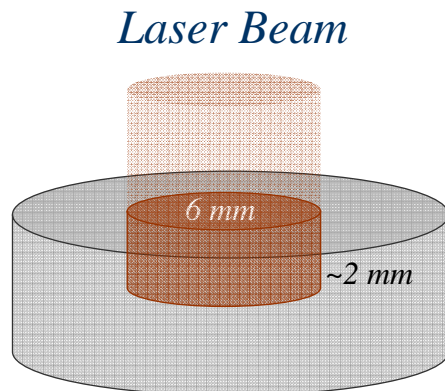


- The aim of this work was to explore the applicability of Raman spectroscopy to the analysis of tablet dosage forms

Tablet Analysis with *P^hAT* System

Specification

- ↪ Spot Size: \varnothing 6 mm - sampling depth ~2 mm !!
- ↪ Laser power: 200mW
- ↪ Multiple Fiber Collection

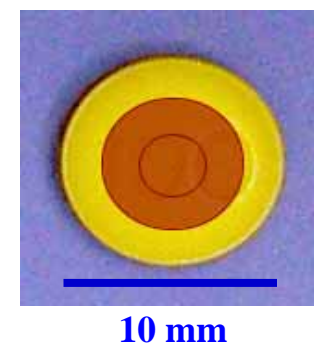
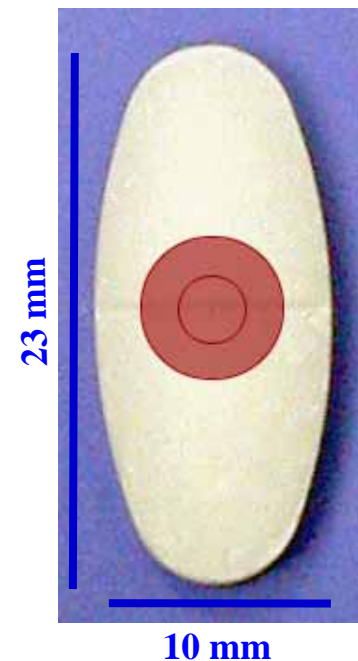


analyzed volume of solid sample

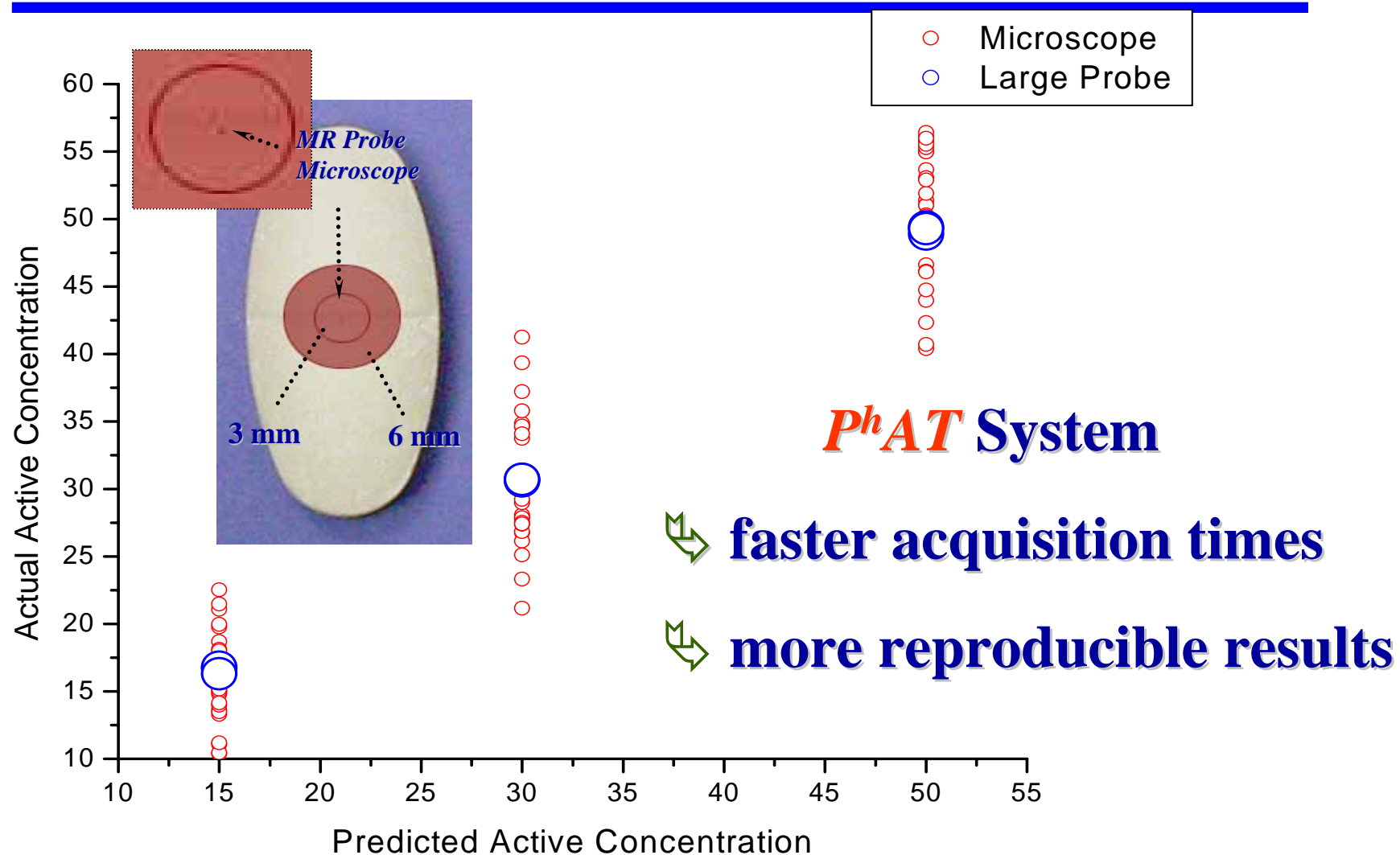


Representative Measurement

- ❖ Solid state mixtures are difficult to analyze reproducibly by traditional Raman analyzers.
- ❖ The small spot size used can make the analysis prone to heterogeneity errors.
- ❖ This is a recognized source of error. Several approaches used to try to address this, including
 - ❖ sample rotation
 - ❖ repeat sampling
- ❖ The *P^hAT System* has been designed to address the limitations of traditional Raman system for quantitative analyses of solid state chemistry.



*Ph*AT System vs. Microscope



Granulator Interface



**Granulation
Bowl
(lid removed)**

Chopper

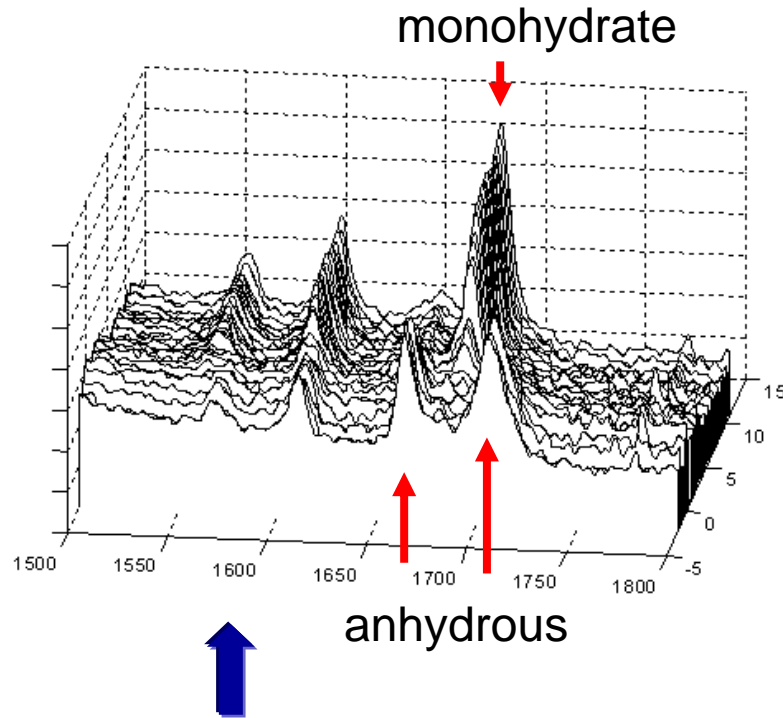
*MR Probe
with NCO-2.5*

***PhAT System
Probehead***



***MR Probe
with IO-1/4"***

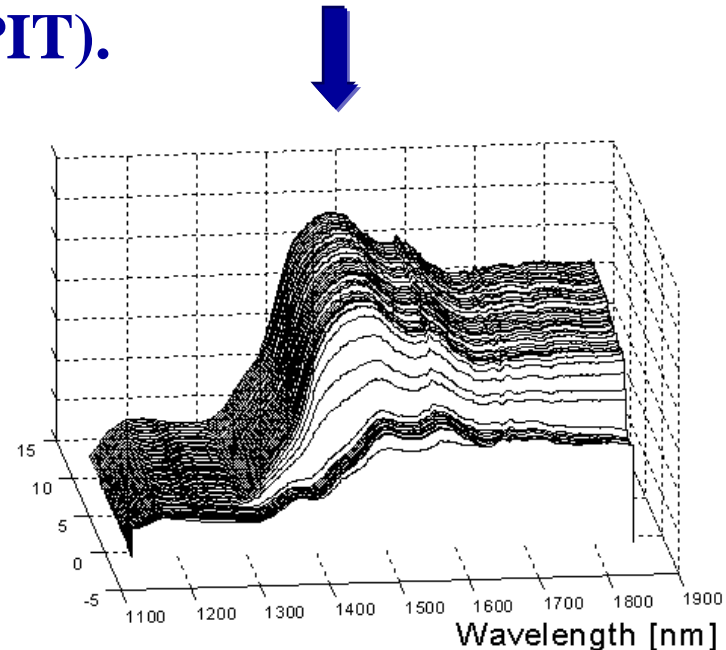
Comparing NIR and Raman



Raman: Clearly identifiable bands are observed for both the monohydrate and anhydrous forms.

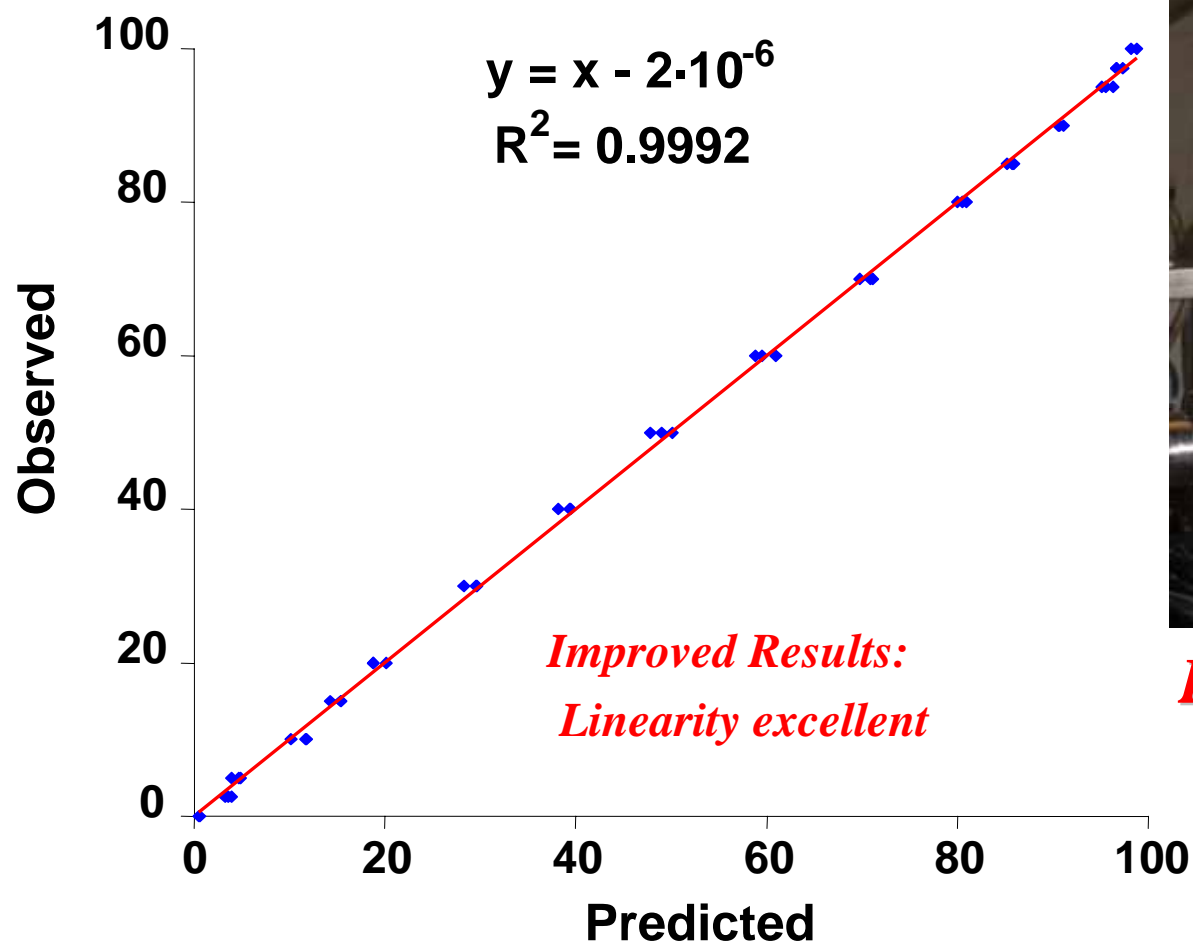
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NIR: Spectrum dominated by free water, prevented quantization of the forms during the transformation (PIT).



RAMANRXN SYSTEMS
REACTION ANALYSIS, MONITORING AND CONTROL

Nitrofurantoin Granulation- Large Spot Size (6 mm)



PhAT System

RamanRxn Systems

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