



Wichita State University Multi-user Instrumentation

KS State EPSCoR Meeting

Lawrence, KS

April 25, 2006



Instruments Purchased

- Bruker Kappa APEX II Single Crystal X-ray Diffractometer
 - Purchase price \$249,000
 - PI – Dr. David Eichhorn
- Olis RSM 1000 Rapid scanning Spectrophotometer with Stopped Flow Capabilities
 - Purchase price \$105,000
 - PI – Dr. Kandatege Wimalasena
- Jasco 815 CD Instrument
 - Purchase price \$75,000
 - PI – Dr. Kandatege Wimalasena



Bruker Kappa APEX II Single Crystal X-ray Diffractometer



- State-of-the-art CCD diffractometer
- Replaced 20-year-old CAD4 point-detector system
- Faster data collection
- Accepts lower quality crystals
- Can be easily used in UG inorganic lab

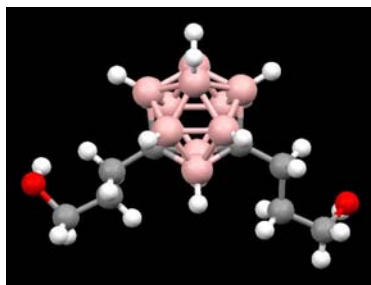


Statistics

- Installed November 2005
- Structures solved for 6 WSU research groups and for K-state
- Approximately 60 structures solved in 6 months
 - Compare with 130-150 solved using old system over 9 years
 - Only one data collection unsolvable



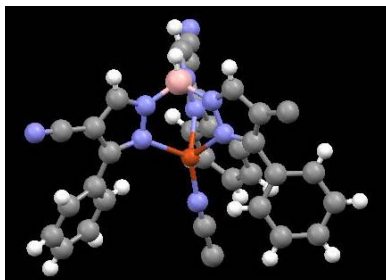
Sample Structures



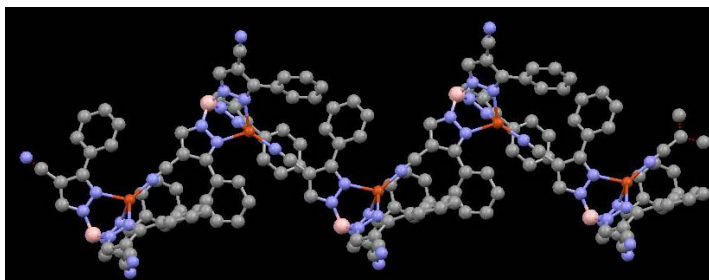
- Solved for Erach Talaty
- Intended Product had only one side chain
- NMR spectrum was too symmetric
- Crystal structure shows two side chains



Sample Structures

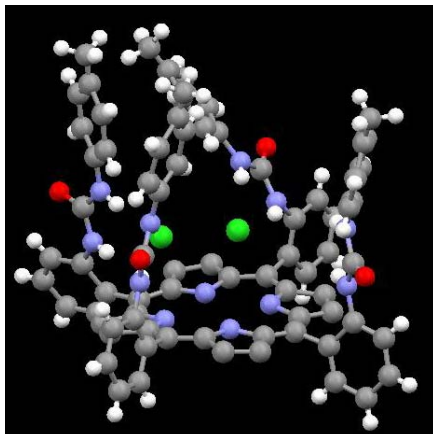


- Structure solved for David Eichhorn
- Structure collected on CAD4 not publishable





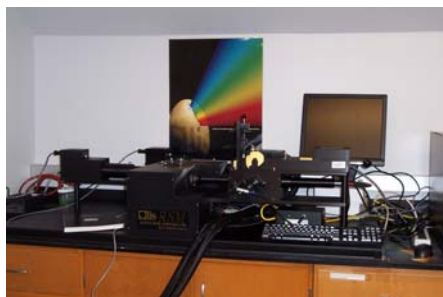
Sample Structures



- Structure solved for Dennis Burns
- Originally solved a few years ago, but had to be sent out because crystals were too small for the CAD4 diffractometer
- Difficulties in obtaining data from original solution



Olis RSM 1000 Spectrophotometer with Stopped flow Capabilities



- State-of-the-art fast scanning UV-vis and fluorescence instrument with stopped flow capabilities
- The first such instrument in the department
- Could be used to collect 1000 spectra per second to characterize fast reactions
- Simplicity of the operation allows the use in UG lab



Jasco 815 Spectrophotometer



- This system can be used for steady-state measurement of CD and absorbance simultaneously.
- The first such instrument in the department
- Collect CD data from 163 nm making it ideal for sensitive biochemical studies such as protein folding and DNA-drug interactions
- Simplicity of the operation allows the use in UG lab

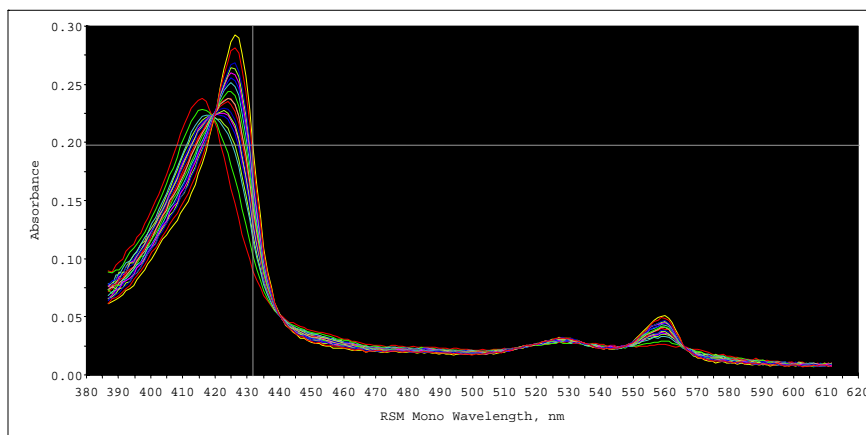


Statistics

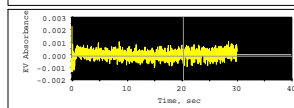
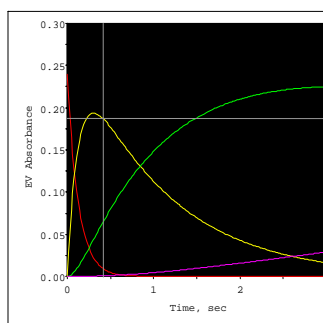
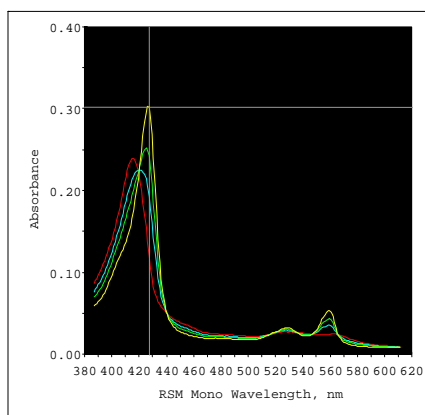
- CD and RSM-1000 were Installed in January, March of 2006, respectively.
- Both instruments are fully functional now and several WSU research groups (Wimalasena, Rillema, Bann, D'Souza) have already successfully used them in their research.
- Some examples of data are shown below.



Stopped-flow Studies of the Reduction of the Heme Centers of Trans-membrane Electron Transport Protein Cytochrome b_{561} by Ascorbic acid



Time –dependent Single Value Decomposition (SVD) of the Experimental data





Studies of the Time Dependent pH Alteration of the Heme Centers of Trans-membrane Electron Transport Protein Cytochrome $b_{561,ox}$

