

## Bruker-AXS D8 DISCOVER Diffractometer

Before you analyze your sample, you must mount it in the appropriate sample holder. Several sample holders are available in the X-ray lab. Choose the one that meets your needs and then place the sample holder in the appropriate sample stage on the goniometer.

Before opening the D8 door, check for any abnormalities in and around the instrument. Give particular attention to the shutter lights on the X-ray tube. The **green light** indicates that the tube is energized (light should be lit). The two **red lights** indicate the **shutter position** (if they are lit the shutter is open and you must not open the doors on the D8; if the red lights are off, then it is safe to open the doors and mount the sample stage on the goniometer).

### System Control Buttons

The control panels of the D8 are located at the front side of the system.

#### Stop Button

If hit, it switches off the control electronics and high-voltage generator immediately. The X-ray source is turned off, and all moving drives will stop instantly.

#### Turn On/Off Illumination

This button turns the fluorescent lights located in the D8 enclosure on or off.

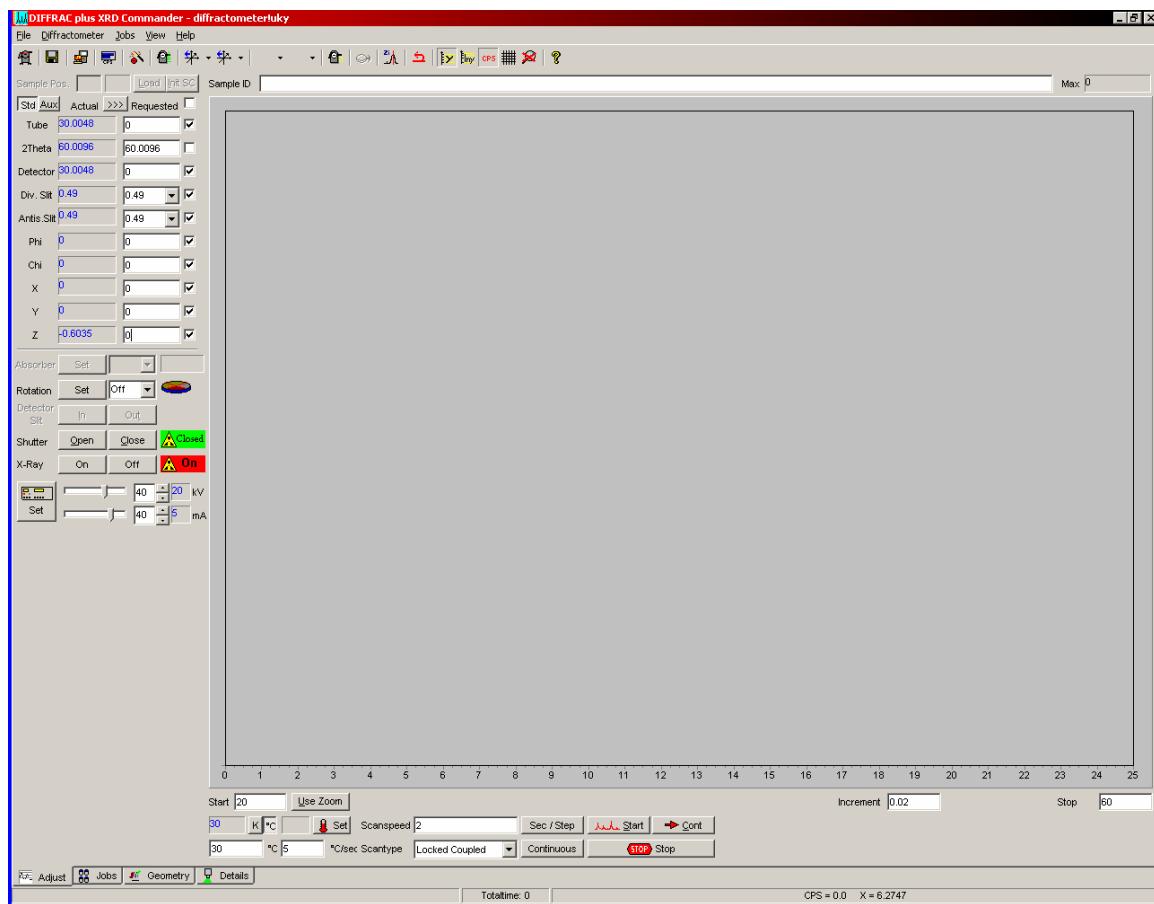
#### Turn On/Off Fan

This button turns the fan on top of the D8 enclosure on or off.

#### Open Door Button

Under normal operating conditions the door handles are locked by a mechanical shutter. To open the front door(s) this button must be pressed. Then the front door(s) can be opened. If the Open Door button is activated while the tube window is open, the X-ray shutter will close automatically. After closing the front doors, the X-ray shutter can be opened again.

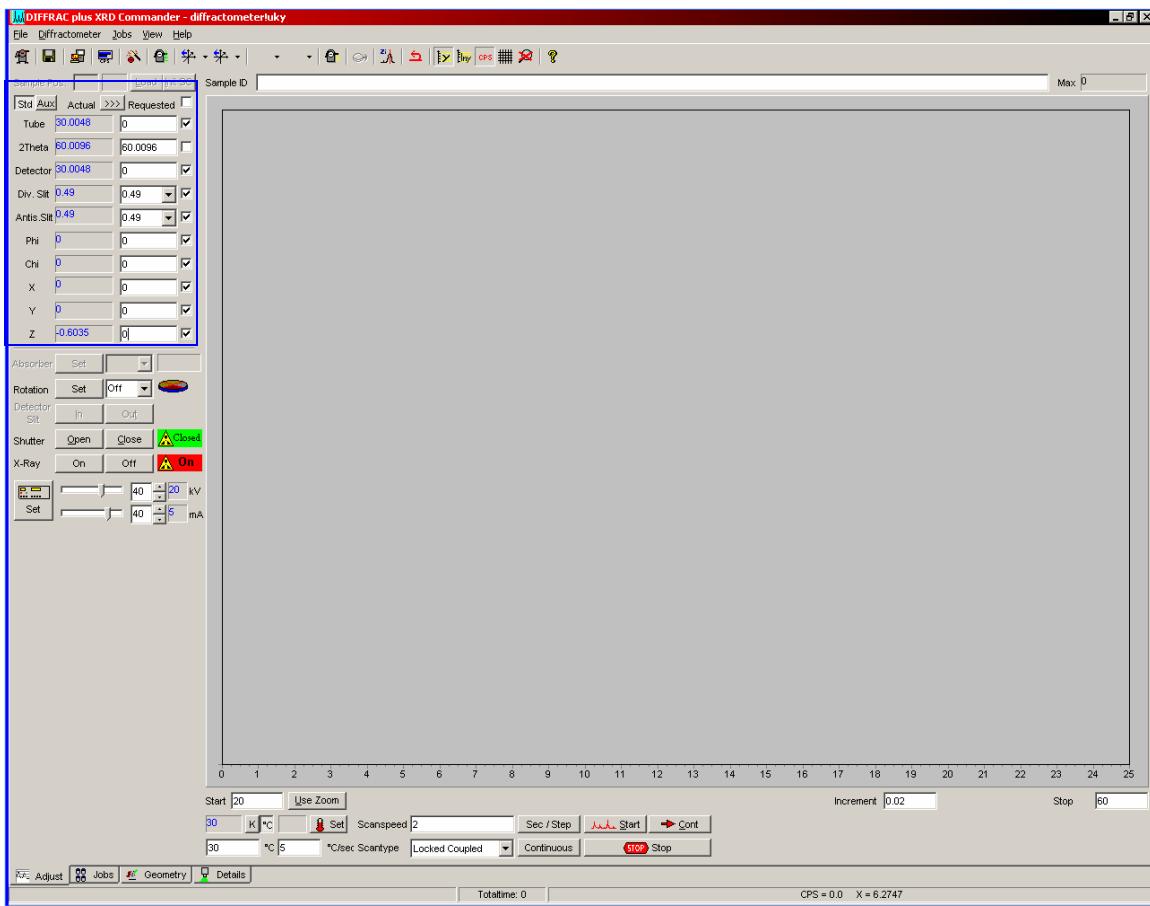
**XRD Commander** is the main measurement program in the DIFFRAC suite. It can be used to perform immediate measurements to get a quick overview of a sample or to align the diffractometer, as well as to perform batch measurements.



The **XRD Commander** window is separated into up to five areas:

### Drive Control

This area shows all configured goniometer drives. For each drive, its actual position is shown in blue. If any of the drive positions are displayed in dark red, you will not be able to use the D8 — **Ask for help**. The checkmarks at each drive control the operation of the drives. Only drives that are checked will be affected by these commands. To control all drives, use the checkmark at the top of the Requested area.



## Diffractometer Components Control

This area is used to control various components of the D8 for standard runs. These controls should remain as they are set. If you need to **change any** of these controls please **ask for help**.

### Scan Control

In this area, the parameters for immediate measurements can be set.

#### *Scantype*

Choose the scantype from the dropdown list — Z (Z scan) or Locked Coupled.

A Z scan is used to position a sample at the correct height on the Z drive. A Z scan should be performed for each sample before the XRD measurement — if you do not know how to make a Z scan, please **ask for help**.

A Locked Coupled scan is used for standard XRD scans of any  $2\Phi$  values.

#### *Start, Stop, and Increment*

Enter the start  $2\Phi$  (a value  $\geq 2\Phi$ ). If you start a scan of  $< 2\Phi$ , please **ask for help**.

Enter the stop  $2\Phi$  (a value  $\leq 140\ 2\Phi$ ). If you need to go beyond a stop value of  $140\ 2\Phi$ , **ask for help**.

Enter the increment value or stepsize for the scan.

#### *Scanspeed*

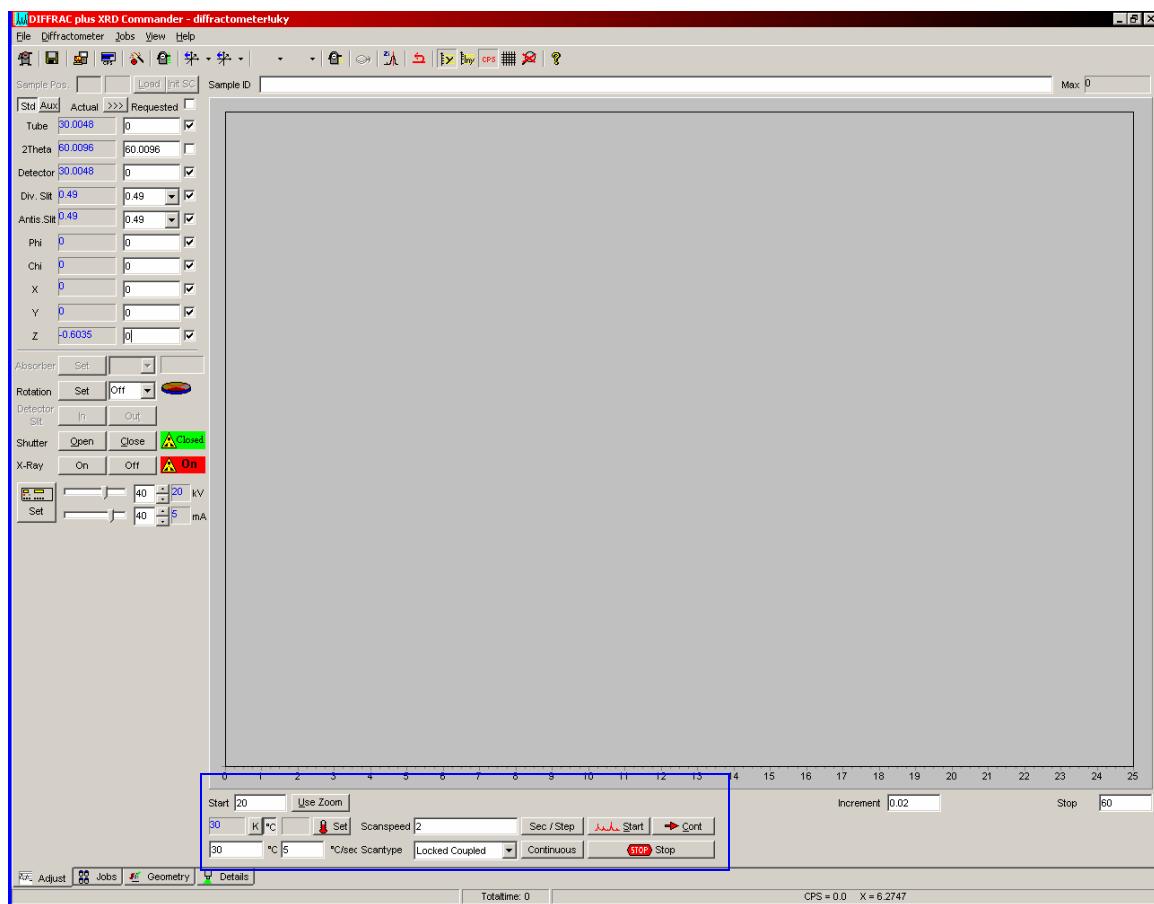
Enter the scan speed. Use the push button to the right of the input field to switch between seconds per step and degrees per minute.

### *Continuous/Stepscan*

Press the button to change between continuous or stepscan mode. The actual setting will be displayed on the button.

### *Start, Stop, Cont*

These buttons are used to begin or end an immediate measurement. The Cont button will continue an interrupted scan.



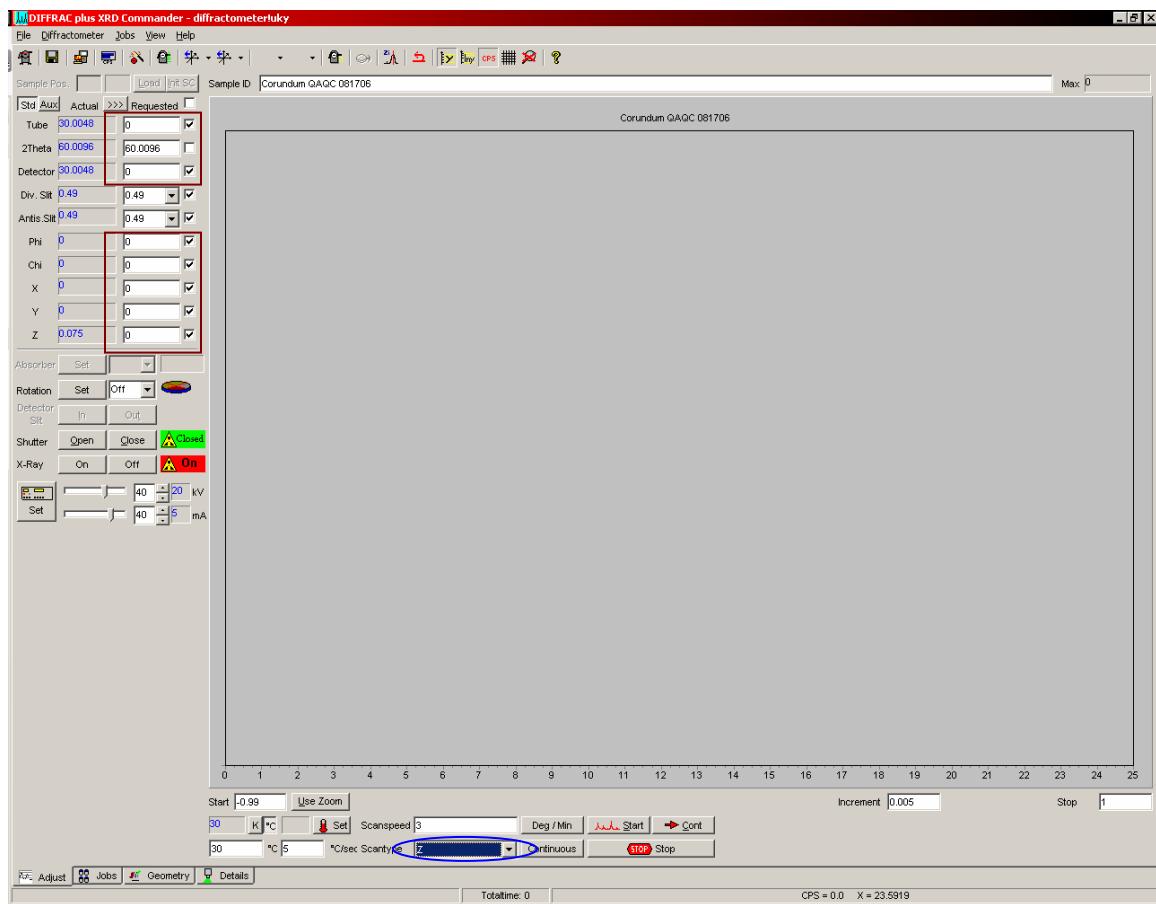
### **Chart Area**

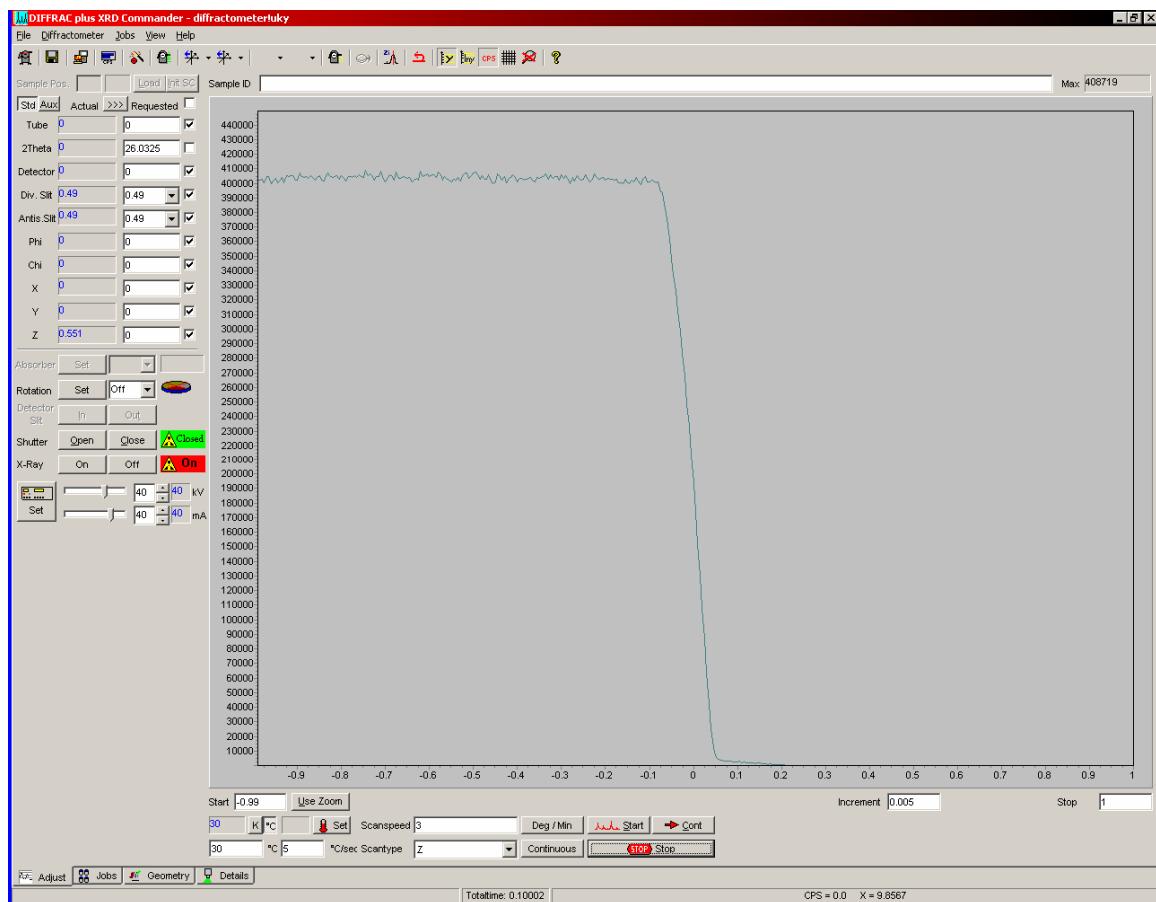
The chart area shows the current scan data.

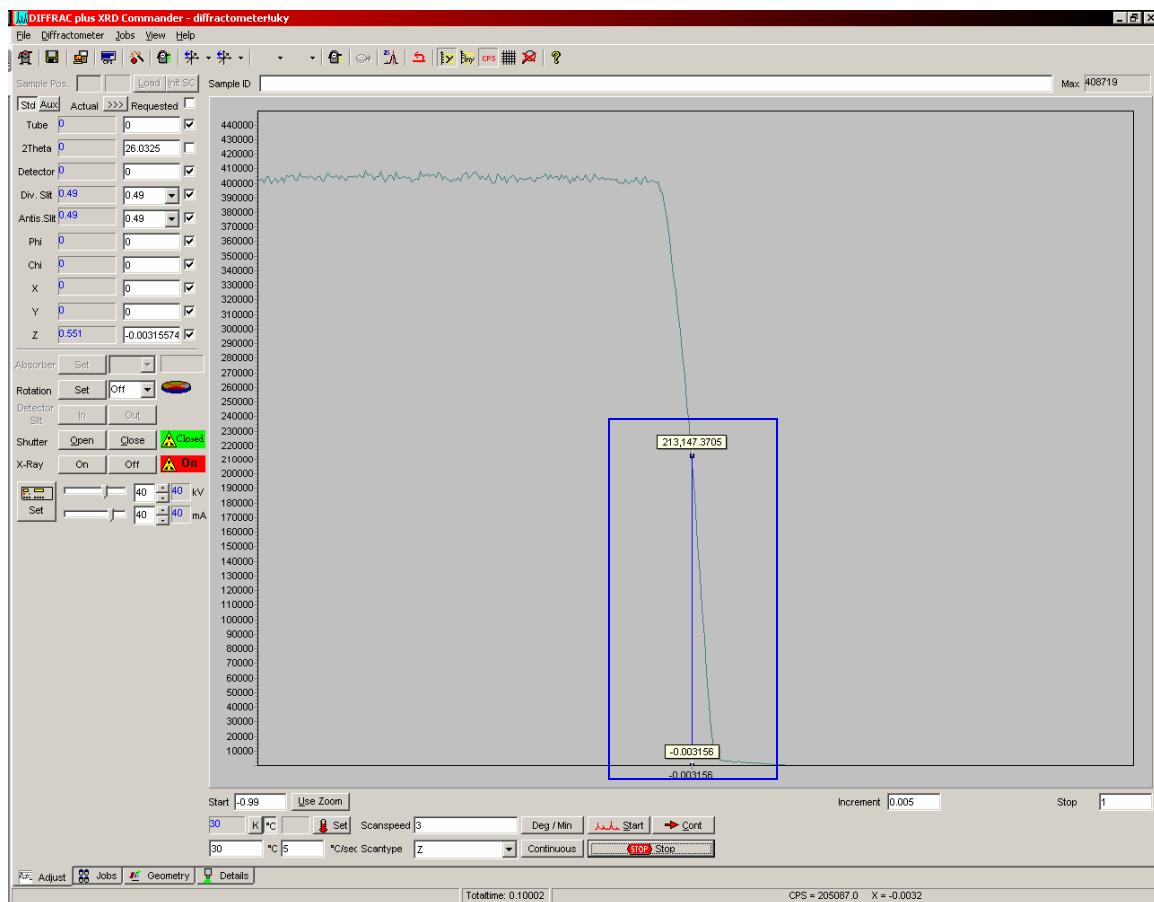
### Z Scan Setup

In order to find the Z drive zero position for your sample,

- In the **Drive Control** area set all drives to zero and place checks in all drive positions.
- Set the *scantype* to Z.
- Place a copper filter in the front detector slit housing.
- Run the scan.
- Using the mouse, find the midpoint of the Y axis intensity ( $400,000/2=200000$ ), double left click, and the correct Z value will be placed in the Z drive control box.
- Remove the copper filter from the detector slit housing.

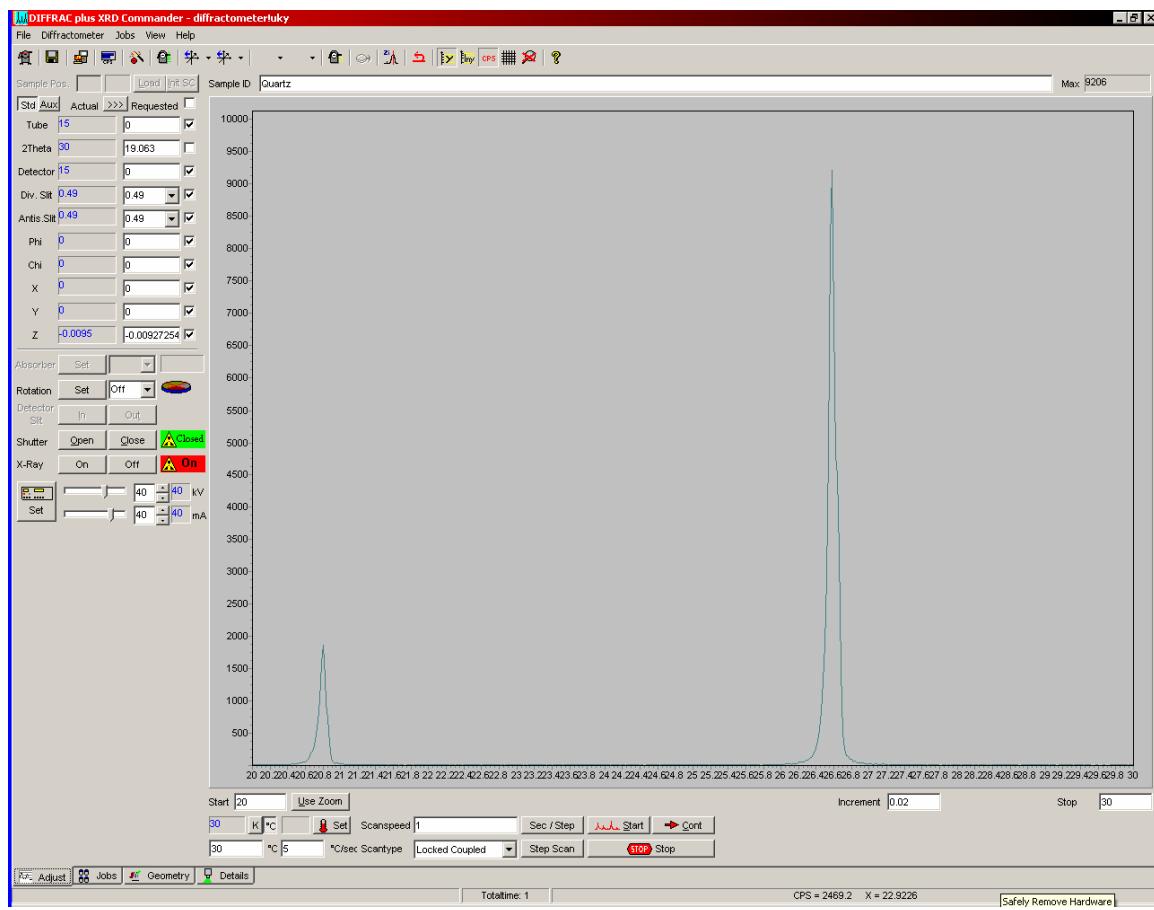






### XRD measurement

- Set the *start, stop*  $2\Phi$  angles and the increment value.
- Set the *Scanspeed*.
- The continuous button should be displayed.
- Press Start to begin the measurement.



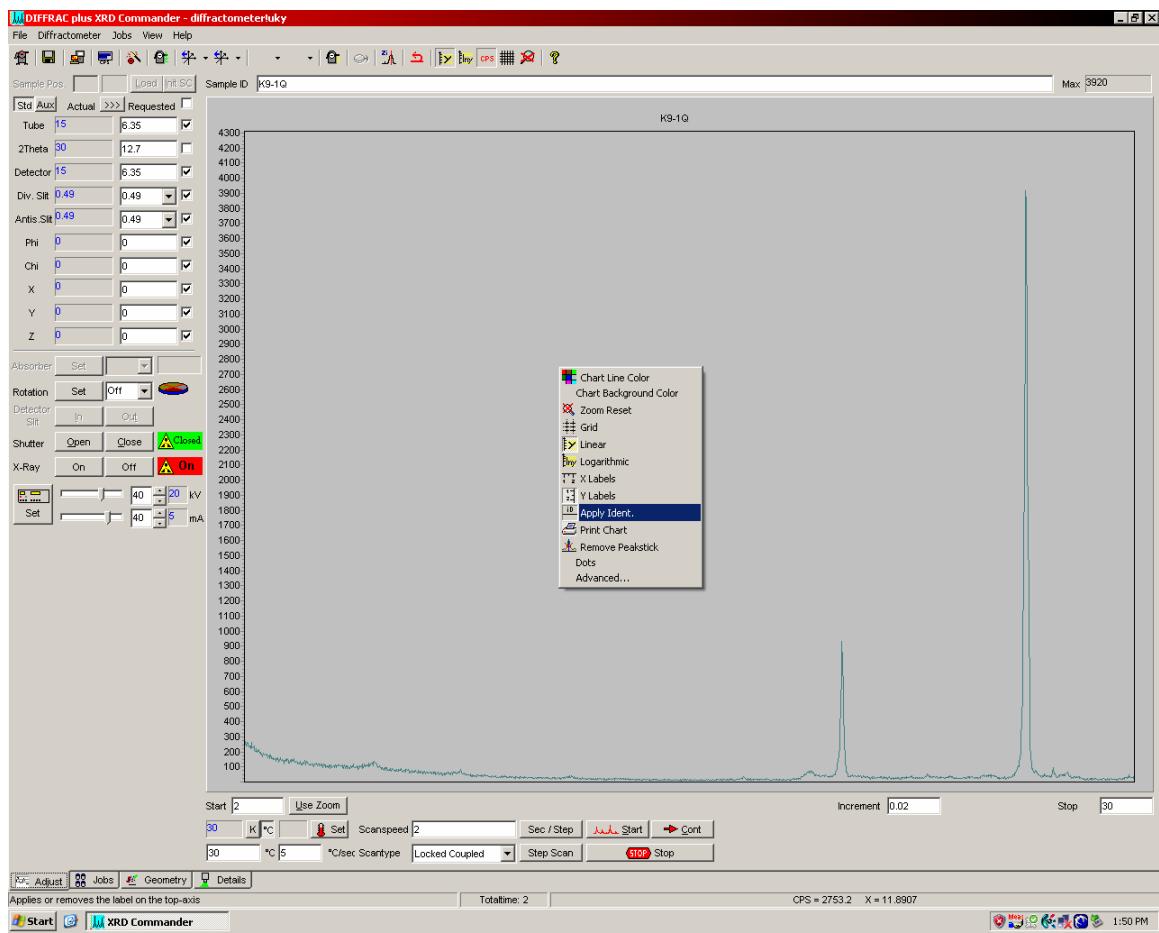
### *After the scan is complete*

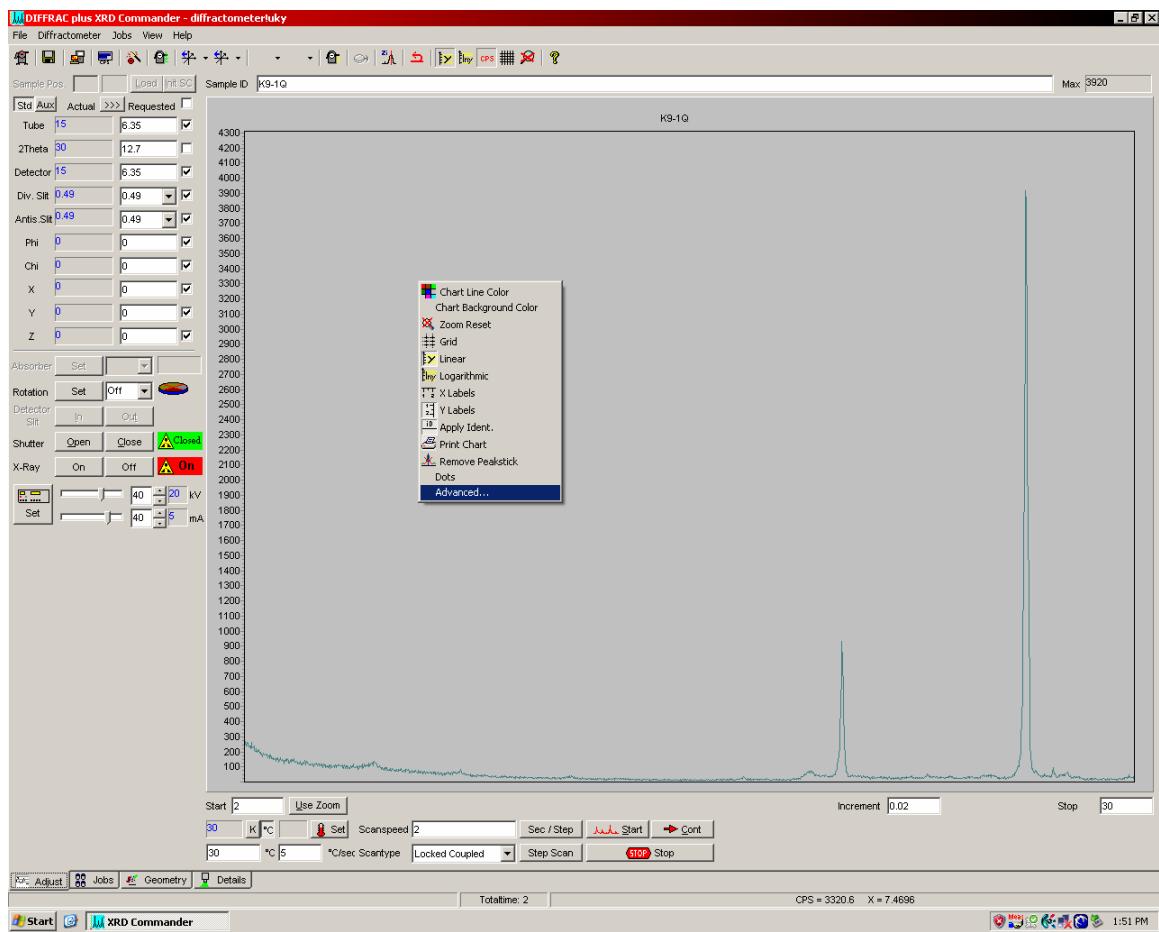
Using Menubar→File Menu→Save As, the measured data can be saved as a RAW data file to your folder on the hard drive. XRD Commander displays the Save As dialog box, and you must enter the RAW filename. The filename can be anything you wish; however, the Sample ID that was used in the Chart Area box does not carry over to the Save As box. The RAW data file can later be examined (e. g., with EVA).

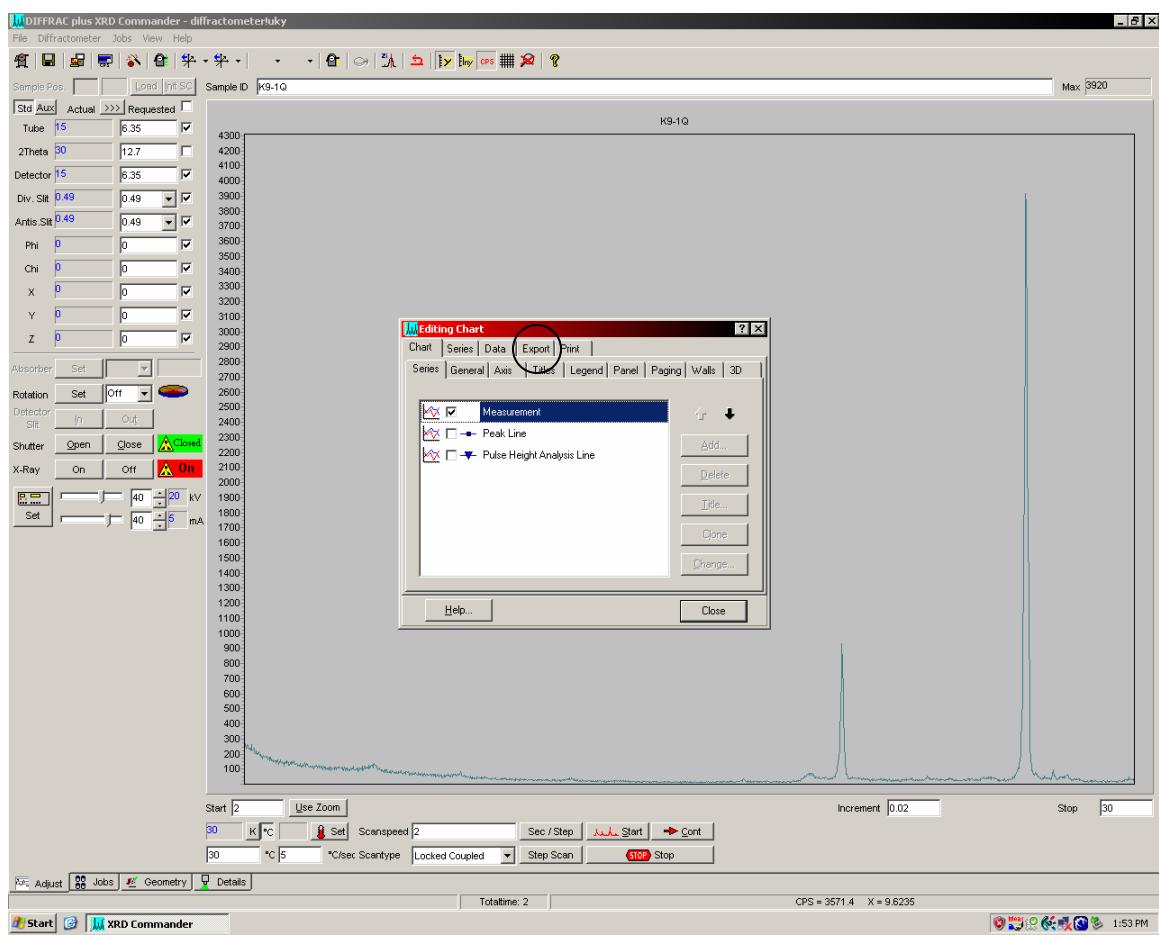
If you click the right mouse button inside the Chart area, a popup menu will appear offering the following options:

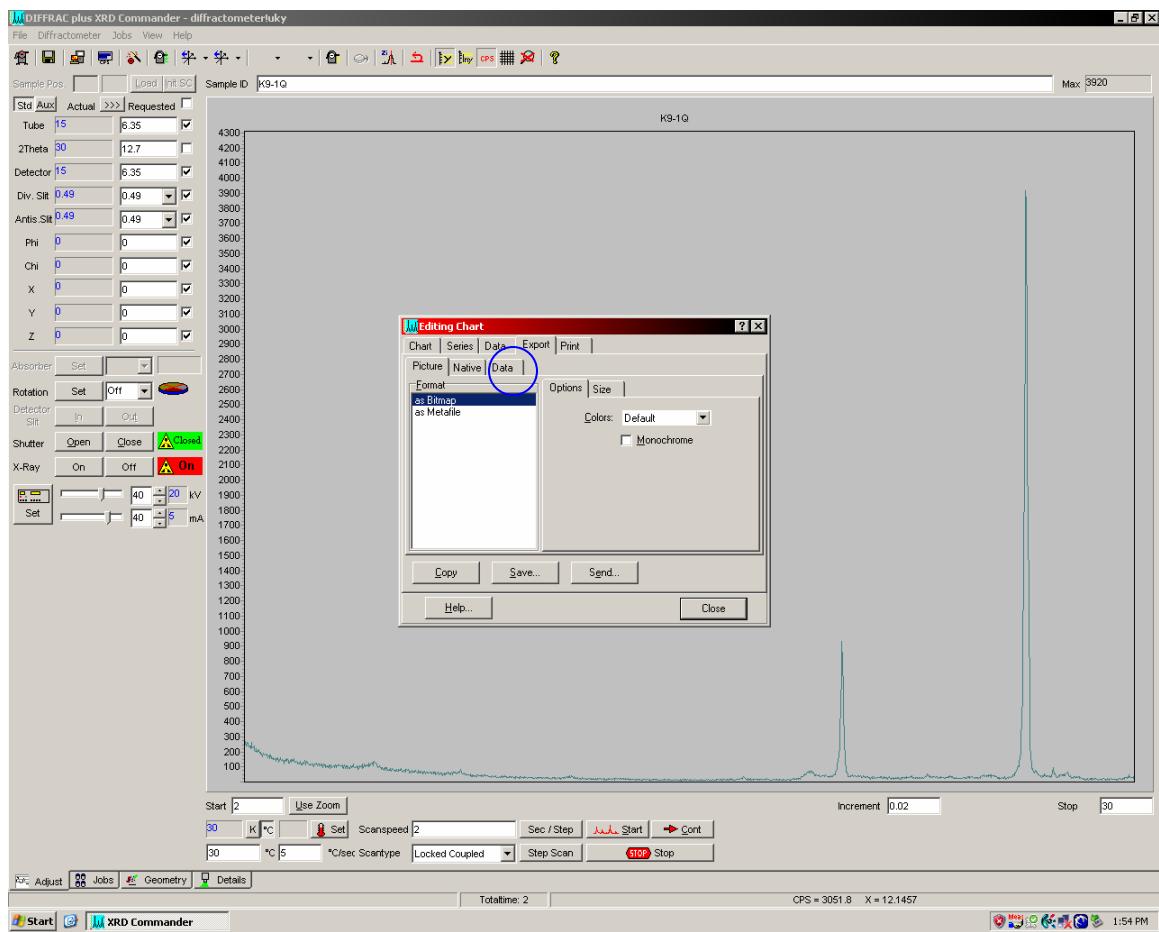
- Chart Line Color
- Chart Background Color
- Zoom Reset
- Grid
- Linear
- Logarithmic
- X Labels
- Y Labels
- **Apply Ident** (applies the sample identification on the top axis)
- Print Chart
- Remove Peakstick
- Dots (shows the scan data as little dots instead of connected lines)
- **Advanced** (shows advanced customized options for the chart area such as **Save the chart data as a Text, XML, HTML, or Excel file**).

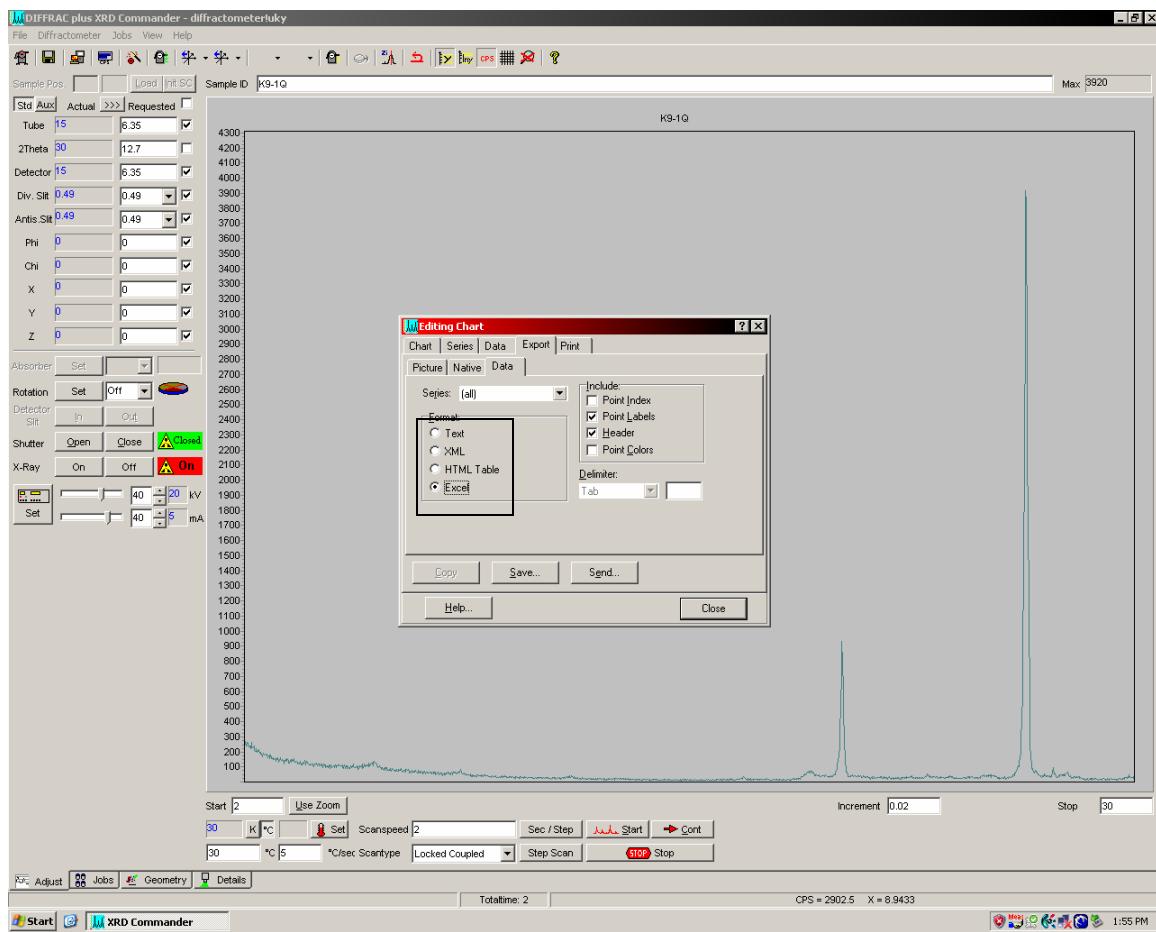
Export→Data→Excel→Save As to your folder on the hard drive.











After you have completed your measurement, minimize XRD Commander. **Do not close the program.**