

10/24/2016

The purpose of this week's experiment is to determine the EPR spectrum's dependency on the angle of the Co-60 irradiated sugar crystal. These spectra will be compared to the powder spectrum collected 10/17/2016.

Freq = 9.42079 GHz

Power = 1.02 mW

CF = 336.0 mT

SwWid = +/- 10 mT

SwTime = 8 min

Mod Wid = 0.1 mT

Amp = 1

Time C = 0.3 s

Data Points = 2048

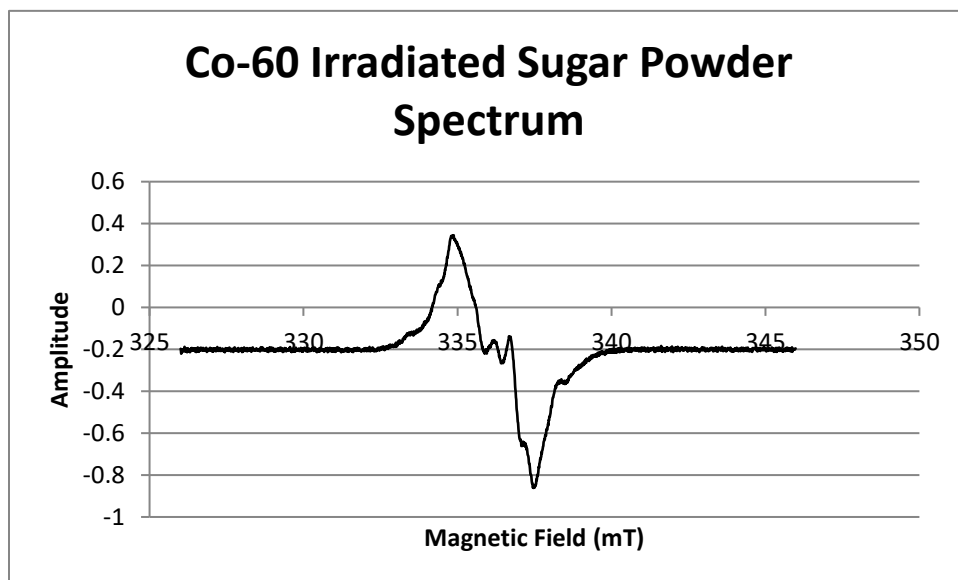


Figure 1. Co-60 irradiated sugar crystals were ground with mortar and pestle and analyzed by EPR with the conditions listed above.

Date collected: 10/17/2016

Analysis of sample

Figure 2. A single crystal of Co-60 irradiated sugar was taped to the outside of an EPR tube and analyzed at $0^\circ \rightarrow 90^\circ$ rotation in 10° increments with the operating conditions as listed below.



All following spectra of this document were collected with the following parameters:

Freq = 9.42079 GHz

SwWid = +/- 10 mT

Amp = 1

Power = 1.02 mW

SwTime = 8 min

Time C = 0.3 s

CF = 336.0 mT

Mod Wid = 0.1 mT

Data Points = 2048

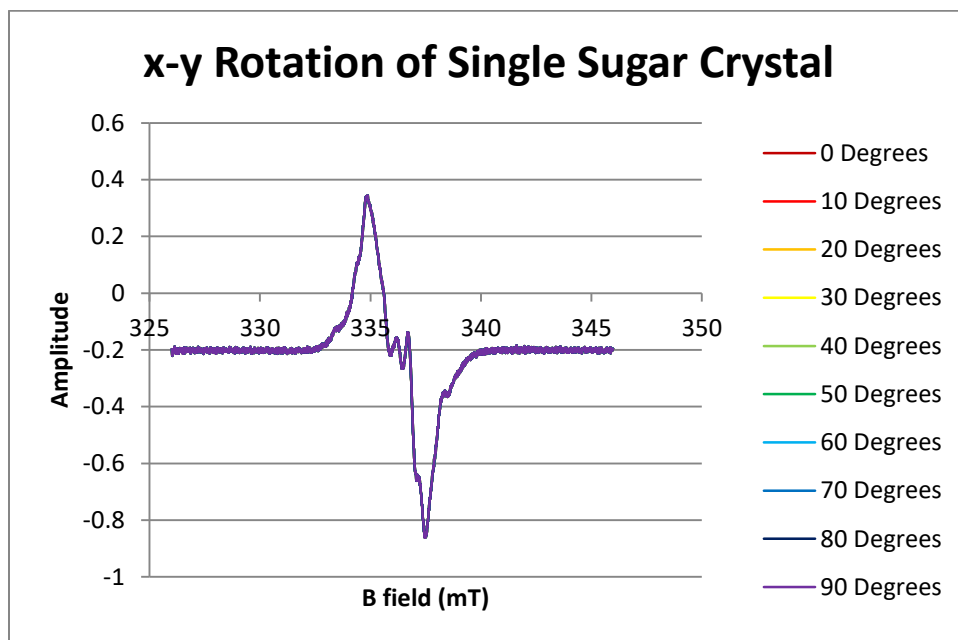


Figure 3. Compilation of EPR rotation spectra from 0-90° in 10° increments with the operating conditions as listed above. The degree of rotation along the x-y plane was set as shown by the setup in Figure 2.

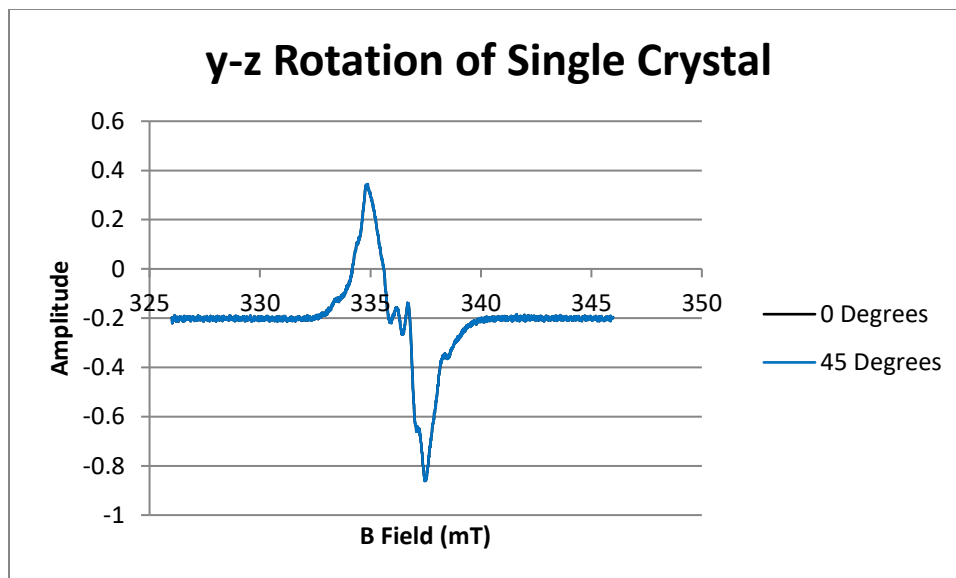
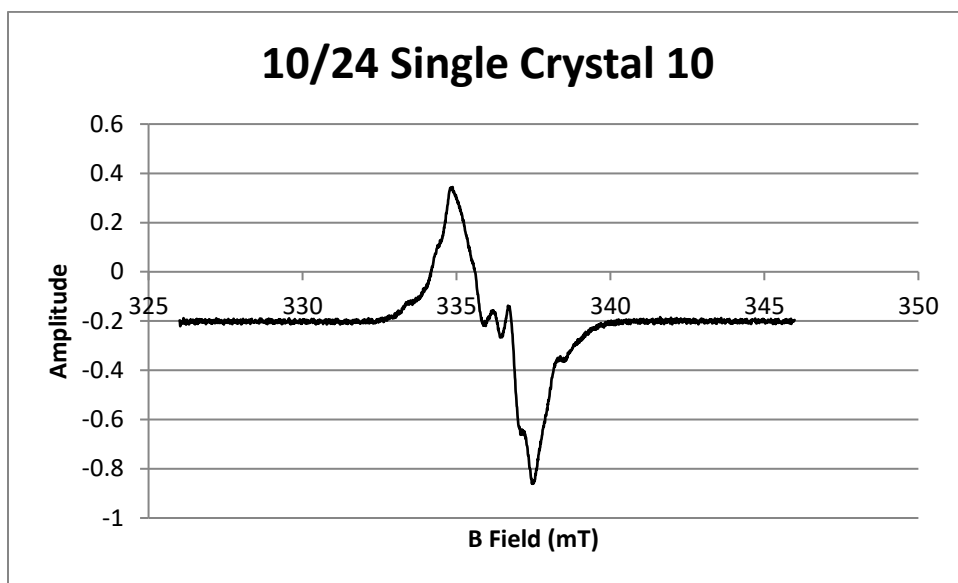
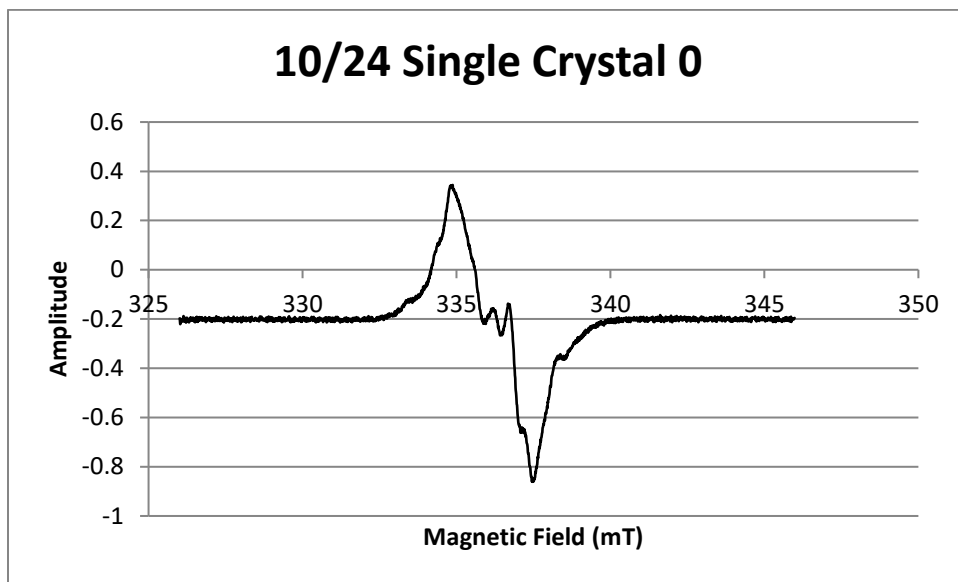


Figure 3. Compilation of EPR spectra of 0° and 45° rotations along the y-z plane with the operating conditions as listed above. The degree of rotation along the x-y plane was roughly estimated by removing the taped crystal from the EPR tube, rotating it along the y-z plane, and re-taping the crystal.

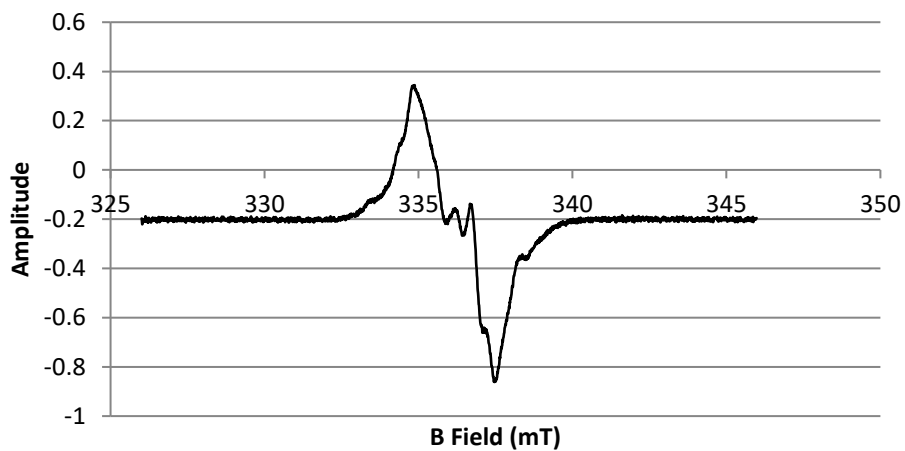
Conclusions:

There is no difference between the spectra of the sample as it is rotated or between the single crystal spectra and powder spectrum, therefore the sugar crystal is not a perfect, single crystal.

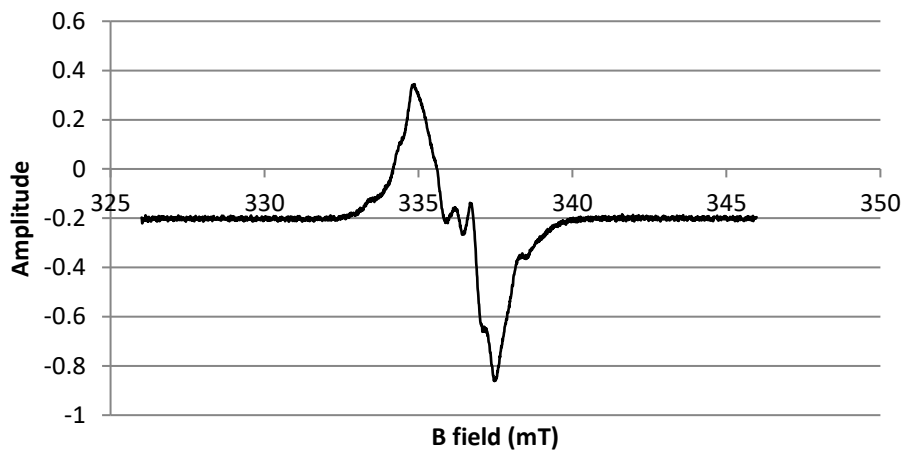
Individual Spectra from the compilations:



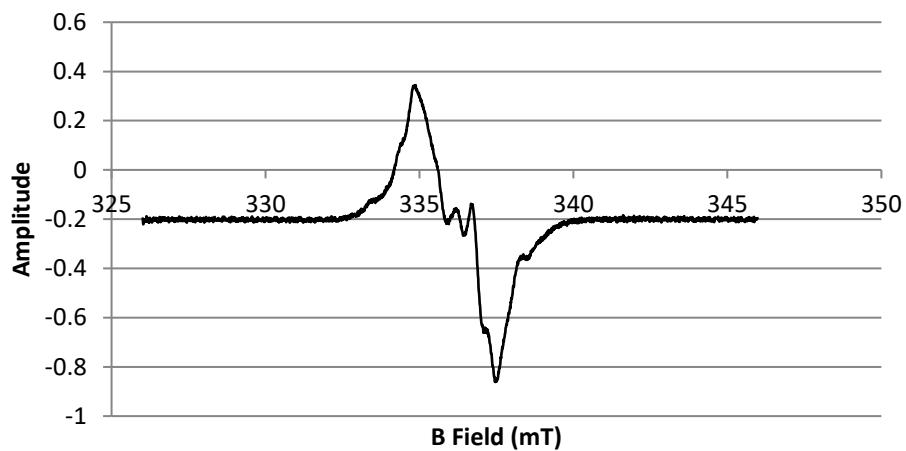
10/24 Single Crystal 20



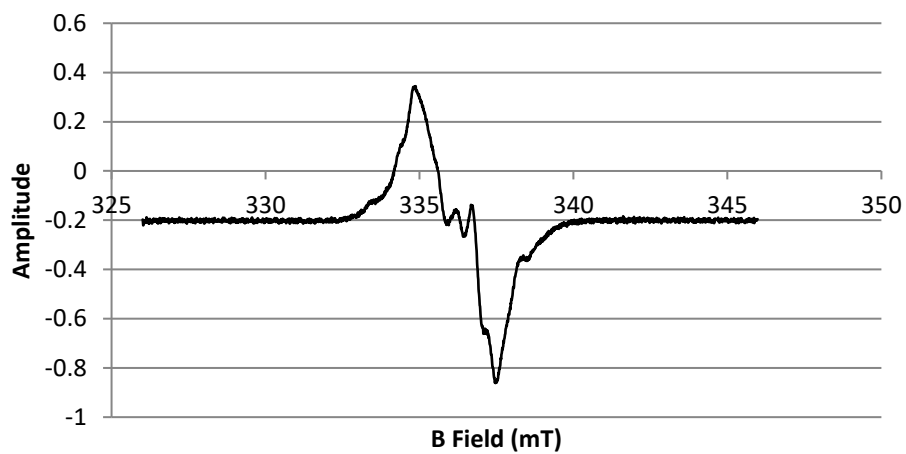
10/24 Single Crystal 30



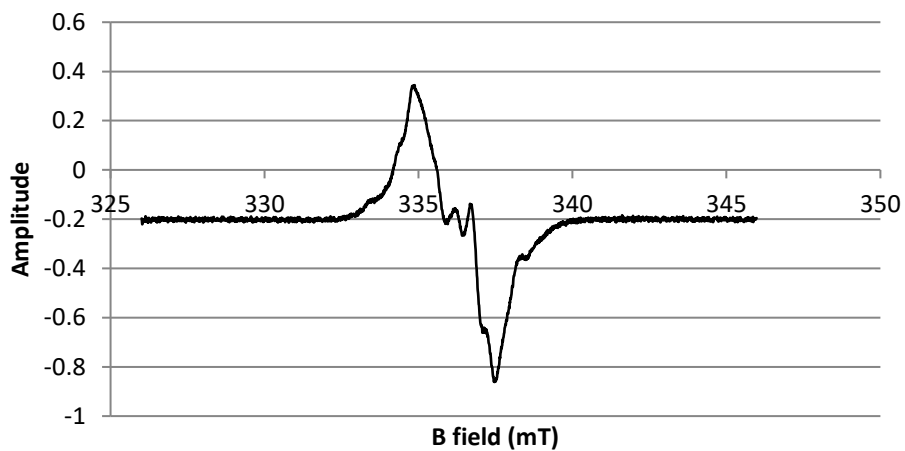
10/24 Single Crystal 40



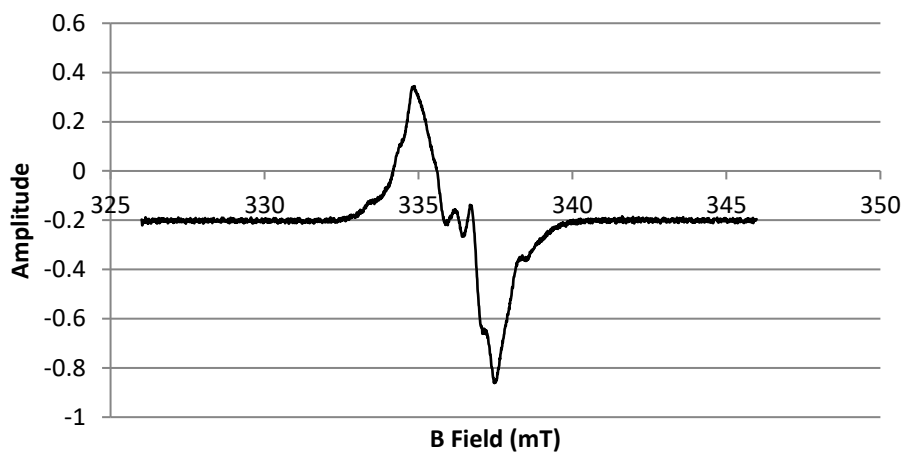
10/24 Single Crystal 50



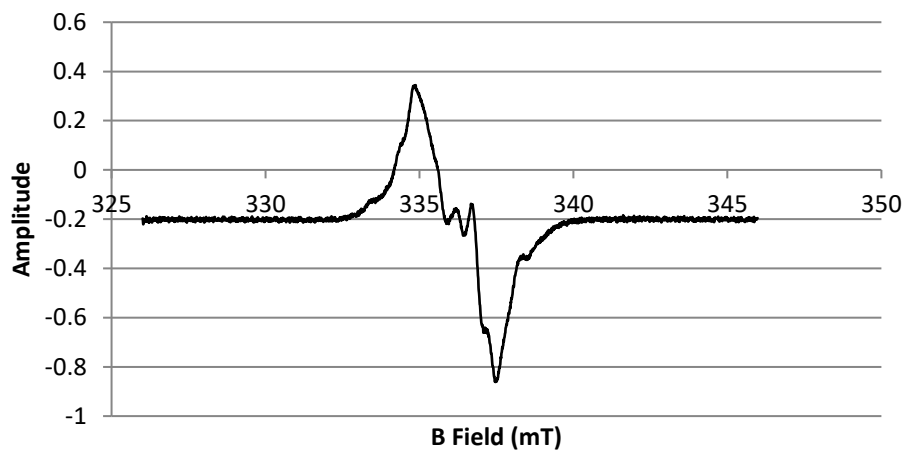
10/24 Single Crystal 60



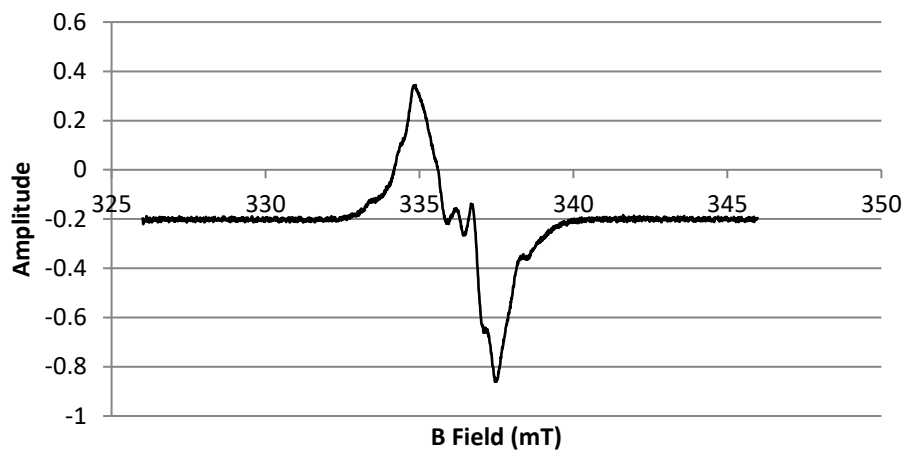
10/24 Single Crystal 70



10/24 Single Crystal 80



10/24 Single Crystal 90



y-z Single Crystal Rotation 45

