A. Authors, Institutions, Overview

❶ 1. Title - *Enter a title, beginning with a descriptive reference to the specimen material or other characteristics specific to this data record, e.g. "Polyvinyl Acetate Degradation During XPS Measurements." Please refrain from using titles beginning with the name of the spectroscopy, e.g. avoid titles like "AES Study of. . ..*

$CuCl_2$ by XPS

❶ 2. Authors, Institutions, and Locations (city, state, province, or country) - List *authors* and affiliations, *in order of* appearance in SSS.

Richard P. Vasquez	Jet Propulsion Laboratory California Institute of Technology	Pasadena, CA 91109-8099
Author	Institution	Location
Author	Institution	Location
Author	Institution	Location
Author	Institution	Location
Author	Institution	Location

❶ 3. Abstract — *Summarize and include key information about the specimens and spectra, such as specimen material, measurement procedures, and significance of the research. The abstract will be reprinted verbatim.*

X-ray photoemission measurements of high purity $CuCl_2$ are presented. XPS studies of Cu compounds in this laboratory have been motivated by the need to identify species on chemically etched high temperature superconductor surfaces. (e.g. Size. Ref. 1).

❶ | **9.** Key Words - *List selected phrases ond words to* help *readers search for information in the database, e.g. Auger* electron *spectroscopy, oxidation, corrosion, surface segregation. Be selective, but thorough.*

X-ray photoemission copper (II) chloride, copper compounds

❶ | **10.** Spectra Category - *Check the suggested category of the dots record: Technical,* Comparison, or *Reference (see the overview of instructions* for definitions). *The* editors moy *suggest* on *alternate category, based* on *the recommendations of referees.*

☐ Technicol ☒ **Comparison** ☐ **Reference**

❸ | **11.** References — list *citations to articles reloted to the doto record using the style of J. Vat. Sci.Technol.*

1. R. P. Vasquez, M. C. Foote, and B. D. Hunt, J. Appl. Phys. 66, 4866 (1989).
2. R. W. G. Wyckoff Crystal Structures, 2nd eel. (Wiley, New York, 1963), Vol. 1, p. 345.

❺ | **12. Acknowledgements**

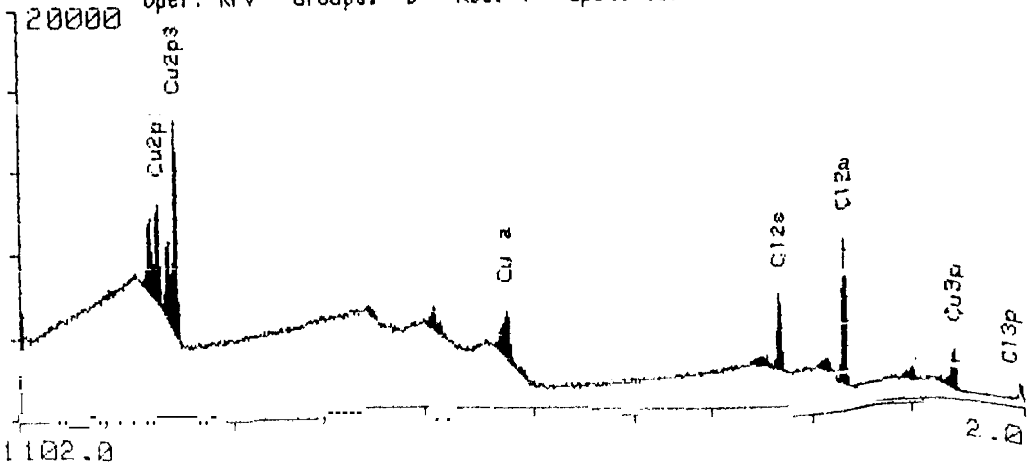
This work was supported by NASA/CACT and BMDC/IST.

Tuesday 11/30/1993
14:21:34
CuCl2 pressed into In

(1) CuCl2_1

\# of Scans 1
Flood Gun 0.0
eV 1100.93
Counts 3861

Oper: RPV Groups: 8 Res: 4 Spot: 1000 u



Survey

SURFACE COMPOSITION TABLE
CuCl2_1
CuCl2 pressed into In

ElemBE	cot-l-’ ‘d Gun	Flood BE	Delta Facto	Sens r	# of Scans	eV/ group	Area	Relative Area	Atom %
Cu2p3	9?)5.24	0.0	-4.24	9.748	1	137.5	45423	500575	33.91
Cl2p	198.91	0.0	2,09	2,395	1	137,s	21750	975502	66.09

A. Authors, Institutions, Overview

❶ **1. Title** — *Enter a title, beginning* with a *descriptive reference to the specimen material or other characteristics* specific to *this data record, e.g. "Polyvinyl Acetate Degradation During XPS Measurements. " Please refrain from* using titles beginning *with* the name *of the spectroscopy,* e.g. avoid *titles* like *"AES Study of. . . .* •

CuCl$_2$ by XPS

❶ 2. Authors, Institutions, and Locations (city, state, province, or country) — *List authors and affiliations, in order of appearance in SSS.*

Richard P. Vasquez	Jet Propulsion Laboratory California Institute of Technology	Pasadena, CA 91109-8099
Author	Institution	Location
Author	Institution	Location
Author	Institution	Location
Author	Institution	Location
Author	Institution	Location

❶ 3. Abstract — ***Summarize and include key information about the specimens and*** **spectra,** ***such as specimen material, measurement procedures, and significance of the research. The abstract will be reprinted verbatim.***

X-ray photoemission measurements of high purity CuCl$_2$ are presented. XPS studies of Cu compounds in this laboratory have been motivated by the need to identify species on chemically-etched high temperature superconductor surfaces (e.g. see Ref. 1).

❶ **4.** Corresponding Author - ***Provide detailed information for the author chosen as principal contact for technical questions or questions from SSS editors.***

Vasquez	Richard		P.
last Name	**First Name**		**Middle Initial**
Jet Propulsion Laboratory, California Institute of Technology			
Institution			**Department**
4800 Oak Grove Drive			MS 302-306
Address, PO Box			**Mail Stop**
Pasadena	CA	91109-8099	USA
City	**State**	**Zip Code**	**Country**
(818)354-0359	(818) 373-4540		
Phone	**Fax**	**E-Mail**	

❶ **5. Technique** and # of **Spectra** Submitted – ***Check the technique used and enter the number of spectra being submitted, including all calibration spectra. Complete a copy of Section F for each spectrum.***

☒ **XPS** ☐ **AES** 5

❶ 6. **# of** Calibration Spectra in Data Record

0

❶ 7. # of Spectra for SSS publication — ***Enter the number of spectra for which hard-copy publication is being requested. For*** **accepted** ***data records comprising large numbers of spectra, all of the spectra will be entered*** **into the AVS** ***electronic database, but it may only be feasible to publish a representative number of spectra*** **in Surface** ***Science Spectra. An opportunity to identify specific spectra*** **for** ***publication is given in Field 2, Section F.***

4

❺ 8. publish Auger Derivative **Spectra** – ***Auger spectra submitted maybe displayed in Surface Science Spectra as N(E) data alone or as superimposed N(E) and derivative forms.*** **The** *default* **display mode will** ***include both forms. Check your preference.***

☐ Display **both forms** ☐ **Display N(E)** only

❶ | **9.** Key Words – *List selected phrases and words to help readers search for information in the database, e.g. Auger electron spectroscopy, oxidation, corrosion, surface segregation. Be selective, but thorough.*

X-ray photoemission, copper (II) chloride, copper compounds

❶ | **10.** Spectra Category - *Check the suggested category of the dots record: Technical, Comparison, or Reference (see the overview of instructions for definitions). The editors may suggest an alternate category, based on the recommendations of referees.*

☐ Technical ☒ Comparison ☐ Reference

❸ | **11.** References – *list citations to articles related to the data record using the style of J. Vat. Sci. Technol.*

1. R. P. Vasquez, M. C. Foote, and B. D. Hunt, J. Appl. Phys. 66, 4866 (1989).
2. R. W. G. Wyckoff, Crystal Structures, 2nd ed. (Wiley, New York, 1963), Vol. 1, p. 345.

❺ | **12.** Acknowledgements

This wok w's supported by NASA/CACT and BMDO/IST.

B. Specimen Description

❷ 1. Host Material - Provide a generic description of the specimen, such os nylon, 606 1 Al, or SiO_2. For layered structures, the host material is the "bulk" substanco near the surface. For instance, XPS of an ultra-thin metal film on a thick SiO_2 layer on an Si substrate would be SiO_2 because the XPS would not probe the Si.

Copper (II) chloride

❸ 2. Chemical Abstract Service (CAS) Registry # — Entor the CAS Registry number of the host materiel.

7447-39-4

❸ 3. Material Designation Code and Organization - Provide any alternate standard designator code specifying the host material, e.g. 1033 for carbon steel, and identify the organization that developed the designator code, e.g. AISI.

Organization Code

❷ 4. Host Composition – fist the principal elements present or tho chemical formula, impractical, e.g. Li, P, O, or Li_3PO_4.

$CuCl_2$

❸ 5. Chemical Name - Enter the full chemical name of the host material according to IUPAC conventions, e.g. for Li_3PO_4, Lithium Orthophosphate.

Copper (II) chloride

❸ 6. Specimen Manufacturer/Supplier – Provide the name of the manufacturer aria/or supplier of the host material or give a reference to how the host was made, e.g. thermally grown SiO_2 on Si.

Aldrich Chemical Co.

❷ 7. Specimen Form – Give a physical description of the host, e.g. MC. OSFET, reagent, single-crystal wafer, stub from corroded fender for brand X pickup, etc.

Powder, 99.999% purity.

❹ 8. Lot Number – Provide the code that identifies the production run. etc.

03806DV

❸ | 9. Structural Formula - *Include information such as a description of the crystal lattice and orientation, e.g. [1 0.1 0] hexagonal close-packed, and/or comments such as fracture surface at grain boundary, etc. At a later date, this field will use a formula encoding scheme.*

Monoclinic, a = 6.70 Å, b = 3.30 Å, c = 6.85 Å, β = 121° (Ref. 2)

Fields 10-13 refer to the ***host material.*** They are included to facilitate database searches.

❷ | **10.** Homogeneity - *Check one that best applies.*

☒ **Homogeneous** ☐ Inhomogeneous ☐ **Unknown**

❶ | **11. Phase** — *Check one that best applies.*

☒ **Solid** ☒ **Powder** ☐ Liquid ☐ Gas

❶ | **12. Crystallinity** – Check *one that best* applies.

☐ **Single Crystal** ☒ Polycrystalline ☐ **Amorphous** ☐ **Unknown** Crystallinity

❸ | **13.** Electrical Characteristics – *Check one that best applies.*

☐ **Conductor** ☐ **Superconductor** ☒ **Semiconductor** ☐ **Dielectric** ☐ **Unknown**

0114. **Material** Family – *Check one that best applies.*

☐ Metal ☒ **Inorganic Compound** ☐ Organic **Compound** ☐ **Polymer** ☐ **Biological** Material ☐ **Composite**

❸ | **15. Special** Material Classes - **Check** *all appropriate boxes. No entry is needed if these Special Classes do not apply. If "Other," describe in "as received condition"* in *Field 17.*

☐ **Ceramic** ☐ **Glass** ☐ **Thin Film** ☒ **Powder** ☐ **Fiber** ☐ Coating ☐ **Other**

☐ **Suggested New Class Types** ....

❺ | **16.** History and Significance – *This is a comment field for background information about the specimen.. e.g. moon rock retrieved by Apollo IX mission, or a discussion of why the spectra were taken. Also, include comments on purity or known contaminants and results of other analytical techniques.*

❷ |**17.** As Received Condition - ***Describe the physical condition of the specimen as it was supplied to the spectroscopist, e.g. as grown, paint delaminating from metal stub, etc. Include the thermal and storage history of the specimen as well as physical condition.***

99.999 % purity powder, sealed bottle as received from manufacturer.

❷ |18. Analyzed Region - ***Describe the specimen analyzed qualitatively, e.g. shorted FET gate, same as host material, or weld bead.***

Same as host material

❷ |**19.** Ex ***Situ*** Preparation and Mounting — ***Describe specimen preparation prior to introduction into the spectrometer vacuum system, e.g. as received, washed in ethanol, scraped with a well-pickled file, etc. Also, describe the specimen mounting technique.***

The specimen bottle was unsealed in the ultrahigh purity nitrogen atmosphere of a glove box which encloses the load lock area. The powder was pressed into 99.95% In foil and clipped to the sample holder.

❷ |**20. *In Situ*** Preparation - ***Describe specimen preparation or treatment procedures within the spectrometer vacuum system prior to analysis, e.g. ion sputter cleaning and annealing.***

None.

❸ |**21.** Specimen Temperature During Analysis – ***Enter the temperature in Kelvin.***

300 K

❷ [22. Maximum **Chamber Pressure During Analysis** -- ***Enter the pressure, in Pascal (Torr = 133 Pascal).***

0^{-7} Pa

❸ **23. Pre-Analysis** Beam **Exposures** — *Describe procedures and include comments on the amount of time the analyzed region was exposed to the x-ray or electron irradiation prior to the measurements for these spectra (especially important for beam-sensitive materials).*

None.

❷ **24.** Charge **Control** Conditions and Procedures — *Describe the equipment used to control charge at the specimen during measurement. Include flood gun voltages and current, target bias, the use of metal screens, etc. Also, describe the procedures used to determine the charge control.*

90% transmitting fine mesh proximity Ni screen, flood gun set to minimize peak widths and asymmetry (0 eV, 950 mA filament current)

C. Overall Instrument Description

The fields in this section describe the system excitation source, the analyzer, and the ion gun used in the experiment. The equipment description is divided into parameters universal to all of the spectra in the record, such as electron spectrometer, and parameters that could vary, depending on the experimental condition, such as the energy range and increment. The universal parameters need to be described only once. However, the information in Section E for Variable Instrument Parameters must be completed and collated with the spectra described in Section F, Spectrum Parameters, for each different experimental setup.

O | 1. Spectrometer Manufacturer – *Enter the designer's name, if the instrument was custom-built, and reference a published article, if applicable.*

Surface Science Instruments

0 | **2.** Manufacturer **Model #**

SSX100-501

O | **3.** Analyzer **Type** - *Check one that best* applies. *If "Other," include a description in Field 4 below.*

☐ **Cylindrical Mirror Analyzer (CMA)**

☐ **Double Pass CMA**

☒ **Spherical Sector Analyzer**

☐ **Other**

❶ | 4. **Non-Standard Analyzer or Lens** -- *Describe any non-standard analyzer or lens used and/or any modification or enhancement made in house. If this information is not applicable to this data record, enter "N/A."*

N/A

❷ | **5. Acceptance Angle from Analyzer Axis** – *Enter the acceptance angle. The acceptance angle is usually420 for CMA and00 for hemispherical analyzers.*

0 **degrees**

❶ | **6. Analyzer Mode** – *Check one that best applies.*

☒ Constant Pass **Energy (fixed analyzer transmission)**

☐ **Constant** Retard Ratio

❷ 7. Instrument Throughput Function - *Identify the theoretical energy dependence of the instrument throughput function in the most significant spectral range. if "Other," describe in Field 8 below.*

☐ 1/E ☐ 1/√E ☒ 1 ☐ E

☐ Other

❹ **8. Instrument Thoughput Function Comment** - *Elaborate on any non-standard energy dependence.*

❶ **9. Excitation** Source **Label** - *Check one that best applies.*

☐ **Al Ka** (non-monochromated) ☒ Al Ka (monochromated) ☐ Mg Kα

☐ Other X-Ray ____________ ☐ **Electron Beam**

☐ Other: describe the source ____________

❷ 10. Excitation Source Window or Filter — *Describe any electron shield or radiation filter in the source, e.g. 1.5 μm Al window.*

A u-coated mylar window

❸ 11. **Detector** Description – *Describe the detector used, e.g. spiraltron, dynode, multichannel resistive plate, etc.*

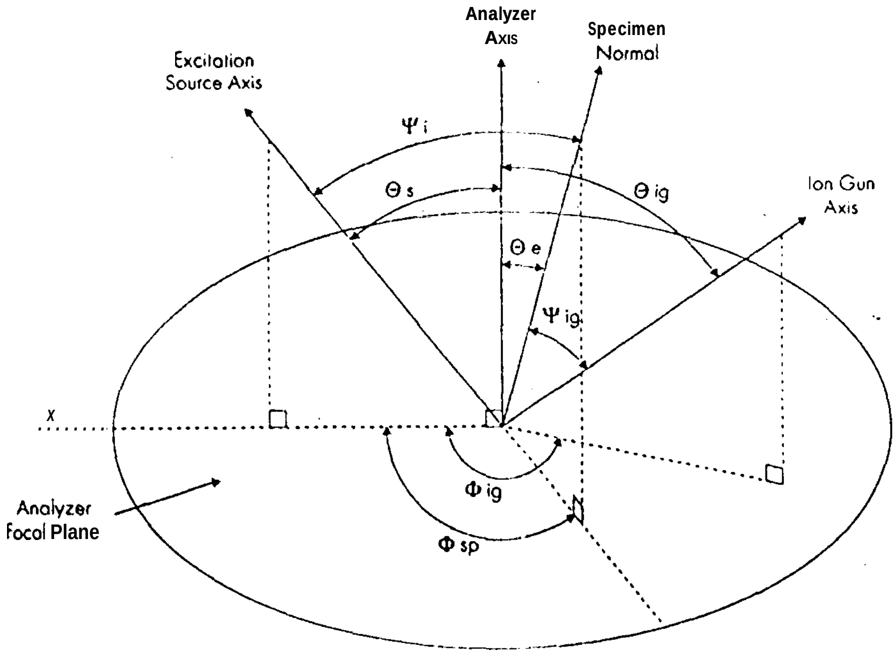
Position sensitive detector

❺ **12.** Ion Gun Manufacturer and **Model** # – *Describe the ion gun as completely as possible if it is non-standard.*

❸ 13. Sputtering Current Measurement Method – *Check one that best applies.*

☐ Biased Stage ☐ Faraday Cup

The spectrometer geometry is specified with respect to a coordinate system in which the axis of the analyzer defines the polar (z) axis, and the x-y axes lie in the analyzer focal plane. The x-axis is defined by the normal projection of the excitation source axis onto the analyzer focal plane. If the analyzer and source axes are coincident, the projection of the ion gun onto the focal plane should be used as the azimuthal reference. It is presumed that all component axes intercept at a common point lying on the specimen surface.



18. **Please** fill in the angles (in degrees) for the submission.

	Field Name	Label	Value *
❶	Emission Angle'	Θ e	55
❷	Incident Angle	Ψ i	55
❶	Source-to-Analyzer Angle	Θ s	70.8
❷	Specimen Azimuthal Angle	Φ sp	0
❸	Sputter Source Incident Angle	Ψ ig	- -
❸	Sputter Source Polar Angle	Θ ig	
❸	Sputter Source Azimuthal Angle	Φ ig	

* *If the angle varies from one* **spectrum** *to another, enter "v."*

❸ 19. Angular Geometry Comments - *Present any additional comments on the scattering geometry that ore important to understand the measurements; e.g. the take-off angle moy be important relative to the specimen structure. In later fields, several geometric factors are requested, such os roster area of ion sputtering, dimensions of excitation area, etc. If the x ond y axes of the sputtered region,* excited *region, etc. do not coincide, describe the orientation of the various regions.*

D. *Calibration Information*

④ 1. **Calibration** Summary – *Describe the calibration of your spectrometer by completing the table below. For each calibration point, enter the element and transition of the calibration peak, the energy (in eV) measured for that peak after calibration, the measured peak width (in eV) and amplitude, and the corresponding sensitivity factor and concentration. The peak amplitude method and units for amplitude and concentration must be the same as those specified in Section L Care should be used to ensure that the correct number of significant figures is entered since the precision is a substantive aspect of calibration. The comment lines may be used to identify the calibration reference material (e.g. Au foil or Cu). If the calibration spectra are included in the data record, each calibration point should be identified with the spectrum used to obtain the data for that transition by entering the corresponding spectrum ID number (Field 1, Section F).*

	ID#	Element Transition	Peak Energy	Width (FWHM)	Peek Amplitude	Sensitivity Factor	Atomic Concentration
1		Au $4f_{7/2}$	84.0	0.85			
2		Cu $2p_{3/2}$	932.5	1.1			
3.							
4							
5							

④ 2. Comments

1 Au film on Si (100) substrate (cited width is for 300 μm x-ray spot, 25 eV pass energy)

2 Sputter-cleaned Cu plate (cited width is for 300 μm x-ray spot,

3 25 eV pass energy)

4

5

E. Variable instrument Parameters

Complete a copy of this section for each set of instrument settings. For example, you might be contributing survey scans that have different energy resolutions, scan rates, etc. from a high-resolution scan of a transition's lineshape. The first field allows you to give each set of instrument settings a number for referencing to specific spectra. You need to complete a copy of this section for each different set.

O 1. Parameter Set # - *Enter an identifying serial number, starting with "l" for this set of variable instrument pyrometers. These numbers will be used in the individual data records to reference the appropriate parameter set for each spectrum described in Section 1.*

1

Source Operating Parameters

❶ 2. Source Energy – *Enter the characteristic energy (in eV) of the excitation source, e.g. 5,000 eV for 05 keV electron beam, 1486.6 eV for Al Kα, 1253.6 eV for Mg Ka, etc.*

1486.6

❸ 3. Source Strength Value and Units - *Enter the strength of the excitation source and the correct corresponding units.* For XPS, this *could* be *anode* power in *Watts or radiation flux* density *on the* specimen *in photons/mm^2 sec or, for electron beams, nanoamps or nanoamps/mm^2.*

200	Watts
Strength Value	Units

❸ 4. Source Beam Size – *List the x and y values for the unscanned excitation source size. Choose the x and y axes 10* coincide with *the manufacturer definitions. If the beam is cylindrically symmetric, x and y are equal. In* other cases, *such as the HP ESCA system, the beam is not cylindrically uniform. In choosing the axes, insure that x and y are orthogonal to each other and to the excitation source axis.*

1000	1000
X Value (μm)	Y Value (μm)

❸ 5. Source **Raster**

☐ Yes ☒ No

❸ | 6. Source Size - *Enter the x and y dimensions,* in *µm, of* the *excitation beam at the specimen surface. Note that this can differ from the source beam* size *entered* previously by *virtue of beom rastering* or *non-normal angle of incidence on the specimen, or both.*

1743 X (µm)

1000 Y (pm)

0 | 7. **Raster** Frame Rate - **Give** *the time interval required to return the beom to a* **given** *spot on the somple (in Hertz) if the source is scanned over the sample.*

____

Q | 8. Analyzer Resolution – *Enter the percent energy resolution used in the measurement on the left* **line if** *the analyzer is operated with a constant retarding ratio. If the analyzer is operated at a constant pass energy, specify the energy resolution used on the right line.*

________ in %(constant retarding ratio) or 1.5 in eV (constant pass)

0 | 9. Analyzer Constants *Enter either the retarding ratio used* in *the measurement or the pass energy, in eV, used.*

________ Retard Ratio o r 150 Pass Energy (eV)

For fields 10-11 below, the x and y axes are the axes defined on the scattering geometry figure from Section C.

❸ | 10. Analyzer Widths - *Enter the size, in µm, of the analyzer entrance* **slit image** *projected onto the specimen surface. This is the analyzer "field of view" expressed in terms of the dimensions of the region on the specimen being analyzed, which maybe energydependent. If energydependent, enter the electron energy at which the widths were measured.*

Was the analyzer width energy-dependent? ☒ **yes'** ☐ **No**

2000 X Value (pm)

2000 Y Value (µm)

1000 at Energy (eV)

③ **11. Analyzer** Angular Acceptance Width — *Indicate if the analyzer angle of acceptance is constant. Due to fundamental electron optics, the field of view and acceptance angle cannot both remain constant. Specify the angle subtended by the analyzer entrance aperture as determined in the x and y directions (for cylindrically symmetric apertures, they will be the same value). Enter N/A for a CMA. Non-standard parameters should be described in Field 4, Section C. If energy-dependent, enter the electron energy at which the angular acceptance was measured.*

Was the analyzer angular acceptance angle constant with energy? ☒ Yes ☐ No

30	30	
X Angle (degrees)	Y Angle (degrees)	at Energy (eV)

E. *Variable instrument Parameters*

Complete *a* copy of **this section for each set of instrument settings. For example, you might-be contributing survey** scans **that** have **different energy resolutions, scan rates, etc. from a high-resolution scan of a transition lineshape. The first field** *allows you* **to give each set of instrument settings a number for referencing to specific spectra. You need to complete a copy of this section for each different set.**

0 | **1.** Parameter Set # - *Enter an identifying serial number, starling with "1" for this set of variable instrument parameters. These numbers will be used in the individual data records to reference the appropriate parameter set for each spectrum described in Section I.*

2

Source **Operating** Parameters

0 | **2.** Source **Energy** – *Enter the characteristic energy (in e V) of the excitation source, e.g. 5,000 eV for a 5 keV electron beam, 1486.6 eV for Al Ka, 1253.6 eV for Mg Kα,* etc.

486 6

❸ | **3.** Source Strength Value and Units — *Enrer the strength of the excitation source and the correct corresponding units. Far XPS, this could be anode power in Watts or radiation flux density on the specimen in photons/mm² sec or, for* electron *beams, nanoamps or nanoamps/mm².*

50	Watts
Strength Value	**Units**

❸ | **4.** Source Beam Size - *list the x and y values for the unscanned excitation source size. Choose the x and y axes to coincide with the manufacturer definitions. If the beam is cylindrically symmetric, x and y are equal. In other cases, such as the HP ESCA system, the beam is not cylindrically uniform. in choosing the axes, insure that x anti y are orthogonai to each other aria' to the excitation source axis.*

300	300
X Value (µm)	**Y Value** (µm)

❸ | 5. Source **Raster**

☐ Yes ☒ No

❸ | **6.** Source Size - *Enter the x and y dimensions, in µm, of the excitation beam at the specimen surface. Note that this can differ from the source beam size entered previously by virtue of beam rastering or non-normal angle of incidence on the specimen, or both.*

523
X (µm)

.300
Y (µm)

❸ | **7.** Raster Frame Rate – *Give the time interval required to* return *the beam to a given spot on the sample (in Hertz) if the source is scanned over the sample.*

____

❷ | **8. Analyzer** Resolution – *Enter the percent energy resolution used in the measurement on* the *left* line *if* the *analyzer is operated with* a *constant retarding ratio. If the analyzer is operated at* a *constant pass* energy, *specify the* energy *resolution* used on *the right line.*

______________ in % (constant retarding ratio)

or

0.25 in eV (constant pass)

❶ | 9. Analyzer Constants - *Enter either the retarding ratio used in the measurement or the pass energy, in eV, used.*

______________ Retard Ratio

or

25 Pass Energy (eV)

For **fields 10-11** below, the x and y axes are he axes **defined on the scattering** geometry figure from Section C.

❸ | **10.** Analyzer Widths - *Enter the size, in µm, of the analyzer* entrance *slit image projected onto the specimen surface. This is the analyzer* "field of view" expressed *in terms of the dimensions of the* region *on the specimen* being *analyzed, which may be energy-dependent. If energy-dependent,* enter *the electron* energy *at which the widths* were *measured.*

Was the analyzer width energy-dependent? ☒ Yes ☐ No

2000
X Value (µm)

2000
Y Value (µm)

1000
at Energy (eV)

③ **11. Analyzer** Angular Acceptance Width - *Indicate if the analyzer angle of acceptance is constant. Due to fundamental electron optics, the field of view and acceptance angle cannot both remain constant.* Specify *the angle subtended by the analyzer entrance aperture as determined in the x and y directions (for cylindrically symmetric apertures, they* will *be the same value). Enter N/A for a* CMA. *Non-standard parameters should be described* in *Field d,* Section C. If *energy-dependent, enter the electron energy at which the angular acceptance was measured.*

Was the analyzer angular acceptance angle constant with energy? ☒ Yes ☐ No

30 X Angle [degrees]

30 Y Angle [degrees)

at Energy (eV)

E. Variable Instrument Parameters

Complete a copy of this section for each set of instrument settings. Far example, you might be contributing survey scans that hove different energy resolutions, scan rates, etc. from a high-resolution scan of a transition's lineshape. The first field allows you to give each set of instrument settings a number for referencing to specific spectra. You need to complete a copy of this section for each different set.

❶ 1. Parameter Set # - *Enter an identifying serial number, starring with "I" for this set of variable instrument parameters. These numbers will be used in the individual data records 10 reference the appropriate parameter set for each spectrum described in Section i.*

3

Source Operating Parameters

❶ 2. Source Energy – *Enter the characteristic energy (in eV) of the excitation source, e.g. 5,000 eV for 05 keV electron beam, 1486.6 eV for Al Ka, 1253.6 eV for Mg Kα, etc.*

1486.6

❸ 3. Source Strength Value and Units - *Enter the strength of the excitation source and the correct corresponding units. For XPS, this could be anode power in Watts or radiation flux density on the specimen in photons/mm^2 sec or, for electron beams, nanoamps or nanoamps/mm^2.*

100	Watts
Strength Value	**Units**

❸ 4. Source Beam Size - list *the x and y values for the unscanned excitation source size. Choose the x and y axes 10 coincide with the manufacturer definitions. If the beam is cylindrically symmetric, x and y are equal. In other cases, such as the HP ESCA system, the beam is not cylindrically uniform. In choosing the axes, insure that x aria' y ore orthogonal to each other aria' to the excitation source axis.*

600	600
X Value (µm)	**Y Value (pm)**

❸ 5. **Source Raster**

☐ Yes ☒ No

❸ 6. Source Size - *Enter the x and y dimensions, in µm, of the excitation beam at the specimen surface. Note that this can differ from the source beam size entered previously by virtue of beam rastering or non-normal angle of incidence on the specimen, or both.*

1046	600
X (µm)	Y (µm)

❸ 7. Raster Frame Rate – *Give the time interval required to return the beam to a given spot on the sample (in Hertz) if the source is scanned over the sample.*

____

❷ 8. **Analyzer** Resolution – *Enter the percent energy resolution used in the measurement on the left line if the analyzer is operated with a constant retarding ratio. If the analyzer is operated at a constant pass energy, specify the energy resolution used on the right line.*

	or	1.0
in % (constant retarding ratio)		in eV (constant pass)

❶ 9. Analyzer Constants – *Enter either the retarding ratio used in the measurement or the pass energy, in eV, used.*

	or	100
Retard Ratio		Pass Energy (eV)

For **fields 10-11** below, the x and y axes are the axes defined on the scattering geometry figure from **Section** C.

❸ **10. Analyzer** Widths - *Enter the size, in µm, of the analyzer entrance slit image projected onto the specimen surface. This is the analyzer "field of view" expressed in terms of the dimensions of the region on the specimen being analyzed, which may be energy-dependent. If energy-dependent, enter the electron energy at which the widths were measured.*

Was the analyzer width energy-dependent? ☒ Yes ☐ No

2000	2000	1000
X Value (µm)	Y Value (µm)	at Energy (eV)

❸ | **11.** Analyzer Angular Acceptance Width - *Indicate if the analyzer angle of acceptance is constant. Due to fundamental electron optics, the field of view and acceptance angle cannot both remain constant. Specify the angle subtended by the analyzer entrance aperture as determined in the x and y directions (for cylindrically symmetric apertures, they will be the same value). Enter N/A Far a CMA. Non-standard parameters should be described in Field A, Section C If energy-dependent, enter the electron energy at which the angular acceptance was measured.*

Wcrs the analyzer angular acceptance angle constant with energy? ☒ Yes ☐ No

30 — X Angle (degrees!

30 — Y Angle (degrees)

_____ — at Energy (eV)

F. Spectrum Parameters

Complete a copy of this section for each spectrum, including calibration spectra, submitted in this data record.

0 1. Spectrum # - *Number the spectra in the data record serially from 1. Enter the number of this spectrum.*

1

❶ 2. Suggested Publication Status of this spectrum

☒ **Print in Surface *Science Spectra*** ☐ **Enter in AVS electronic database only**

0 3. Spectrum Filename - *Enter the filename of this spectrum as designated on the magnetic media submitted.*

CuCl2_1

0 4. Is this a Calibration Spectrum?

☐ **Yes** ☒ **No**

❶ 5. Parameter Set # to Use – *Provide the number identifier (Field 1, Section E) for the set of instrument parameters used to measure this spectrum.*

1

❸ & Date – *Enter the date that the spectrum for this region was measured. The format is YYYYMMDD.*

19890202

❷ 7. **Species Label** – *Provide the symbol for the element being measured in this spectral region, e.g. Cl, N, etc. More than one element may be represented. 1//his is a survey spectrum, enter "survey."*

Survey

❷ 8. Transition **Label** - *Record the core-level transition that is producing this spectrum, e.g. "KLL" for AES, "2p" for XPS, etc. List the corresponding transitions in the some order as you listed the elements in Field 7 above. If the spectrum is o survey scan, enter "survey."*

Survey

❺ | **9. Spectral** Region Comment - *Enter comments describing the spectrum more fully when the element and transition do not adequately characterize the spectrum. For example, provide information about critical experimental variables (temperature, etc.) that should be emphasized or provide comments on the identification of peaks arising from multiple chemical states, satellites, interference between peeks, etc. in the spectrum.*

❶ | **10.** Abscissa Label – **Check** *the appropriate box for the energy* **axis.**

☐ **Kinetic Energy** ☒ **Binding Energy**

❶ | **11.** Abscissa Values - *Enter the energy, in eV, of the first data point displayed on the left in the spectrum plot and the energy increment, in eV/channel, used in the energy scan of this spectrum. For display purposes, Auger kinetic energies will increase from left to right (positive increment value], and XPS binding energies will decrease going from left to right (negative increment value).*

1100.0	-1.074
Starting Value	**Increment Value**

❶ | **12.** Ordinate Label – *Specify they axis label, such as intensity, etc.*

Intensity

❶ | **13.** Ordinate Units - *Specify the units of signal in each channel, such as "arbitrary units," "counts," "counts/sec," etc.*

Counts

❶ | **14.** Number of Data Channels – *Specify the number of channels used to measure the spectrum.*

1024

❷ | **15.** Number of Scans – *Specify the number of times the signal for a given channel was counted.*

1

❷ | **16.** Signal Mode – *Check the appropriate box to identify the dots acquisition mode: direct far an analog signal measurement that is then digitized; V/F for an analog signol digitized using an analog-to-digital converter; pulse single for single-channel pulse counting; multichannel direct for analog measurement using a position-sensitive detector; and multichannel indirect for a multichannel detector with photon conversion.*

☐ Direct Analog ☐ V/F Analog ☐ Pulse Single Channel ☒ Multichannel Direct ☐ Multichannel Indirect

.0117. **Equivalent** Simultaneous Channels - *Enter " 1" for a single-channel detector. For a multichannel detector, enter the number of channels in the spectrum covered by the width of the detector.'*

128

❷ | **18.** Seconds per Scan – *Enter the time needed for one scon in seconds.*

420

❷ | **19.** Total Seconds this Spectrum – *Record the total elapsed time used to acquire this spectrum in seconds.*

420

-- ❹ | **20.** Time Correction - *Record your 'system deed time." For o positive value, the count rote should be corrected by dividing taunt rate by*

(1- dead time) x (time/channel)

For a negative value, the correction is

exp. (measured count rate) x (deed time)

None

O | **21.** Signal Modulation Method - *Check the appropriate field for the signal modulation. Describe any tailored modulation function in Field 2, Section H. Note that only "raw" data, not computer-differentiated date, should be submitted.*

☒ None

☐ Sinusoidal *(sinusoidal modulation/ demodulation)*

☐ Tailored *(using special modulation function)*

☐ Beam Blanking *(chopped beom modulation)*

☐ Beom Amplitude *(modulated beam strength)*

❷ | **22. Lock-in** Parameters - *Complete only if appropriate.*

Peek-to.peak amplitude of the modulation in eV or nA

Modulation frequency of the reference signal in (Hz)

Time constant of the lock-in amplifier used in seconds

F. Spectrum Parameters

Complete a copy of this section for each spectrum, including calibration spectra, submitted in this data record.

❶ 1. Spectrum # - *Number the spectra in the data record serially from 1. Enter the number of this spectrum.*

2

❶ 2. Suggested Publication Status of this **Spectrum**

☒ Print in *Surface Science Spectra* ☐ Enter in AVS electronic database only

❶ 3. Spectrum Filename – *Enter the filename of this spectrum as designated on the magnetic media submitted.*

CuCl2_2

0 [4. Is this a Calibration Spectrum?

☐ Yes ☒ No

❶ 5. Parameter Set # to Use – *provide the number identifier (Field 1, Section E) for the set of instrument parameters used to measure this spectrum.*

2

❸ 6. Date -- *Enter the date that the spectrum for this region was measured. The format is YYYYMMDD.*

19890202

❷ 7. Species Label – *Provide the symbol for the element being measured in this spectral region, e.g. Cl, N, etc. More than one element may be represented. If this is a survey spectrum, enter "survey."*

Cu

❷ 8. **Transition Label** — *Record the core-level transition that is producing this spectrum, e.g. "KLL" for AES, "2P" for XPS, etc. List the corresponding transitions in the same order as you listed the elements in Field 7 above. If the spectrum is a survey scan, enter "survey."*

2 $p_{3/2}$

❺ | 9. Spectral Region Comment - *Enter comments describing the spectrum more fully when the element* ond transcition *do not adequately characterize the* spectrum. *For example, provide information about critical experimental variables (temperature, etc.) that should be emphasized or provide comments on the identification of peaks arising from multiple chemical states,* satellites, interference between peaks, etc. *in the spectrum.*

.0110. Abscissa Label - *Check the appropriate box for the energy axis.*

☐ **Kinetic Energy** ☒ **Binding Energy**

❶ |11. Abscissa **Values** - *Enter the energy,* in *eV, of the first doter* point *displayed on the left in the spectrum plot and the energy increment, in eV/channel, used* in *the energy* scan *of* this *spectrum. For display* purposes, *Auger kinetic energies will increase from left to right [positive increment value), and XPS binding* energies will *decrease going from left to right (negative increment value).*

948,9

Starting Value

-0, 156 "

Increment Value

0112. Ordinate **Label** – *Specify they axis label, such os intensity, etc.*

X ntensity

0113. Ordinate Units - *Specify* the *units of* signal *in each channel, such os "arbitrary units, " "counts," "counts,l'see," etc.*

Counts

❶ |14. Number of Data **Channels** - *Specify* the *number of channels used to measure the spectrum.*

128

❷ |15. Number of Scans - *Specify the number or' times the signal for a given channel was counted.*

20

❷ **16.** Signal Mode - *Check the appropriate box to identity the dots acquistion mode: direct for on analog signal measurement that is then digitized; V/F for on analog signal digitized using an analog-to-digital converter; pulse single for single-channel pulse counting; multichannel direct for analog measurement using a position-sensitive detector; and multichannel indirect for a multichannel detector* with photon *conversion.*

☐ Direct Analog ☐ V/F Analog ☐ Pulse Single Channel ☒ Multichannel Direct ☐ Multichannel Indirect

❶ **17.** Equivalent Simultaneous **Channels** – *Enter "I" for a single-channei detector. For a multichannel detector, enter the number of channels in the spectrum covered by the width of the detector.*

128

❷ **18.** Seconds per **Scan** - *Enter the time needed for one scan in seconds.*

60

❷ **19.** Total Seconds **this Spectrum** – *Record the total elapsed* time *used to acquire this spectrum in seconds.*

1200

❹ **20. Time** Correction – *Record your "system dead time." For o positive value, the taunt rate should be corrected by dividing count rote by*

(1- dead time) x (time/channel)

For a negative value, the correction is

exp. (measured count rate) x (dead time)

None

O [21. Signal /Undulation Method - **Check** *the appropriate field for the signal modulation.* **Describe any** *tailored modulation function* in *Field 2, Section H. Note that only "raw" data, not computer-differentiated data, should be submitted.*

☒ None

☐ Sinusoidal *(sinusoidal modulation/ demodulation)*

☐ Tailored *(using special modulation function)*

☐ Beam Blanking *(chopped beam modulation)*

☐ Beam Amplitude *(modulated beam strength)*

❷ **22. lock-in** Parameters – *Complete only if appropriate.*

Peak-to-peak amplitude of the modulation in eV or nA	Modulation frequency of the reference signal in (Hz)	Time constant of the lock-in amplifier used in seconds

F. Spectrum Parameters

Complete a copy of this section for each spectrum, including calibration spectra, submitted in this data record.

❶ **1.** Spectrum # - *Number the spectra in the data record serially from 1. Enter the number of this spectrum.*

3

❶ **2.** Suggested publication Status of this Spectrum

☒ Print in *Surface Science Spectra* ☐ Enter in AVS electronic database only

❶ **3.** Spectrum **Filename** - *Enter the filename of this spectrum as designated on the magnetic media submitted.*

CuCl2_3

❶ **4.** Is this a Calibration spectrum?

☐ Yes ☒ No

❶ **5.** Parameter Set # to Use - *Provide the number identifier (Field 1, Section E) for the set of instrument parameters used to measure this spectrum.*

2

❸ **6.** Date - *Enter the date that the spectrum for this region was measured. The format is YYYYMMDD.*

19890202

❷ **7.** Species Label - Provide *the symbol for the element being measured in this spectral region, e.g. Cl, N, etc. More than one element may be represented. If this is a survey spectrum, enter "survey."*

Cl

❷ **8.** Transition Label — *Record the core-level transition that is producing this spectrum, e.g. "KLL" for AES, "2p" for XPS, etc. List the corresponding transitions in the same order as you listed the elements in Field 7 above. If the spectrum is a survey scan, enter "survey."*

2p

❺ | **9.** Spectral Region Comment – *Enter comments describing the spectrum more fully when the element and transition do not adequately characterize the spectrum. For example, provide information about critical experimental variables (temperature, etc.) that should be emphasized or provide comments on the identification of peaks arising from multiple chemical states, satellites, interference between peaks, etc. in the spectrum.*

❶ | **10.** Abscissa **Label** – *Check the appropriate box for the energy axis.*

☐ Kinetic Energy ☒ Binding Energy

❶ | **11.** Abscissa Values - *Enter the energy, in eV, of the first data point displayed on the left in the spectrum plot and the energy increment, in eV/channel, used in the energy scan of this spectrum. For display purposes, Auger kinetic energies will increase from left to right (positive increment value), and XPS binding energies will decrease going from left to right (negative increment value).*

208.9	-0.117
Starting Value	Increment Value

❶ | **12.** Ordinate **Label** – *Specify the y axis label, such as intensity, etc.*

Intensity

❶ | 13. Ordinate Units – Specify the *units of signal in each channel, such as "arbitrary units," "counts," "counts/sec," etc.*

Counts

❶ | **14. Number** of **Data Channels** – *Specify the number of channels used to measure the spectrum*

128

❷ | **15.** Number of Scans - *Specify the number of times the signal for a given channel was counted.*

20

❷ | **16.** Signal **Mode** - *Check the appropriate box to identify the data acquisition mode: direct for on analog signal measurement that is then digitized: V/F for an analog signal digitized using an analog-to-digital converter; pulse single for single-channel pulse counting; multichannel direct far analog measurement using a position-sensitive detector; and multichannel indirect for a multichannel detector with photon conversion.*

☐ Direct Analog ☐ V/F Analog ☐ Pulse Single Channel ☒ Multichannel Direct ☐ , Multichannel Indirect

.0117. **Equivalent** Simultaneous Channels – *Enter " 1" for a single-channel detector. For a multichannel detector, enter the number of channels in the spectrum covered by the width of the detector,*

– 128

❷ | 18. Seconds per Scan - *Enter the time needed for one scan in seconds.*

– 60

❷ | **19. Total** Seconds this Spectrum – *Record the total elapsed time used to acquire this spectrum in seconds.*

– 1200

❹ | **20. Time** Correction – *Record your "system dead time. " For a positive value, the taunt rate should be corrected by dividing count rate by*

(1- dead time) x (time/channel)

For a negative value, the correction is

exp. (measured count rate) x (dead time)

None

O | **21.** Signal Modulation Method – *Check the appropriate field for the signal modulation. Describe any tailored modulation function in Field 2, Section H. Note that only "raw" data, not computer-differentiated data, should be submitted'.*

☒ None

☐ Sinusoidal *(sinusoidal modulation/ demodulation)*

☐ Tailored *(using special modulation function)*

☐ Beam Blanking *(chopped beam modulation)*

☐ Beam Amplitude *(modulated beam strength)*

❷ 22. **lock-in Parameters** – *Complete only if appropriate.*

Peak-to-peak amplitude of the modulation in eV or nA

Modulation frequency of the reference signal in (Hz)

Time constant of the lock-in amplifier used in seconds

F. Spectrum Parameters

Complete a copy of this section for each spectrum, including calibration spectra, submitted in this data record.

0 | 1. Spectrum # - *Number the spectra in the data record serially from 1. Enter the number of this spectrum.*

4

❶ | 2. Suggested publication Status of this Spectrum

☒ Print in *Surface Science Spectra* ☐ Enter in AVS electronic database only

❶ | 3. Spectrum Filename - *Enter the filename of this spectrum as designated on the magnetic media submitted'.*

CuCl2-4

❶ | 4. Is this a Calibration Spectrum?

☐ Yes ☒ No

❶ | 5. Parameter Set # to Use - *Provide the number identifier (Field 1, Section E) for the set of instrument parameters used to measure this spectrum.*

3

❸ | 6. Date – *Enter the date that the spectrum for this region was measured. The format is YYYYMMDD.*

19890202

❷ | 7. **Species Label** – *Provide the symbol for the element being measured in this spectral region, e.g. Cl, N, etc. More than one element may be represented'. If this is a survey spectrum, enter "survey."*

Cu

❷ | 8. Transition **Label** - *Record the core-level transition that is producing this spectrum, e.g. "KL1" for AES, "2p" for XPS, etc. List the corresponding transitions in the same order as you listed the elements in Field 7 above. If the spectrum is a survey scan, enter 'survey.'*

LMM

❺ | **9. Spectral** Region Comment – *Enter comments describing the spectrum more fishy when the element and transition do not adequately characterize the spectrum. For example, provide information about critical experimental variables (temperature, etc.) that should be emphasized or provide comments on the identification of peaks arising from multiple chemical states, satellites, interference between peaks, etc. in the spectrum.*

❶ | 10. Abscissa Label – *Check the appropriate box for the energy axis.*

☐ **Kinetic Energy** ☒ **Binding Energy**

❶ | 11. Abscissa **Values** – *Enter the energy, in eV, of the first data point displayed on the left in the spectrum plot and the energy increment, in eV/channel, used in the energy scan of this spectrum. For display purposes, Auger kinetic energies will increase from left to right (positive increment value), and XPS binding energies will decrease going from left to right (negative increment value).*

591.9	-0.195
Starting Value	**Increment Value**

❶ | 12. Ordinate Label – *Specify the y axis label, such as intensity, etc.*

Intensity

❶ | 13. Ordinate **Units** – *Specify the units of signal in each channel, such as "arbitrary units," "counts," "counts/sec," etc.*

Counts

❶ | 14. Number of **Data Channels** - *Specify the number of channels used to measure the spectrum.*

256

❷ | 15. Number of Scans – *Specify the number of times the signal for a given channel was counted.*

20

❷ **16.** Signal Mode - *Check the appropriate box to identify the data acquisition mode: direct for an analog signal measurement that is then digitized; V/F for an analog signal digitized using an analog-to-digital converter; pulse single for single-channel pulse counting; multichannel direct for analog measurement using a position-sensitive detector; and multichannel indirect for a multichannel detector with photon conversion,*

☐ Direct Analog ☐ V/F Analog ☐ Pulse Single Channel ☒ Multichannel Direct ☐ Multichannel Indirect

❶ **17.** Equivalent Simultaneous **Channels** – *Enter "1" for a single-channel detector. For a multichannel detector, enter the number of channels in the spectrum covered by the width of the detector.*

128

❷ **18.** Seconds per **Scan** - *Enter the time needed for one scan in seconds.*

120

❷ **19.** **Total** Seconds this Spectrum – *Record the total elapsed time used to acquire this spectrum in seconds.*

2400

❹ **20.** Time Correction – *Record your *system dead time. " For a positive value, the count rate should be corrected by dividing count rate by*

(1- dead time) x (time/channel)

For a negative value, the correction is

exp.(measured count rate) x (dead time)

None

❶ **21.** Signal Modulation Method – *Check the appropriate field for the signal modulation. Describe any tailored modulation function in Field 2, Section H. Note that only "raw" data, not computer-differentiated data, should be submitted.*

☒ None

☐ Sinusoidal *(sinusoidal modulation/ demodulation)*

☐ Tailored *(using special modulation function)*

☐ Beam Blanking *(chopped beam modulation)*

☐ Beam Amplitude *(modulated beam strength)*

❷ **22.** **Lock-in Parameters** – *Complete only if appropriate.*

Peak-to-peak amplitude of the modulation in eV or nA

Modulation frequency of the reference signal in (Hz)

Time constant of the lock-in amplifier used in seconds

F. Spectrum Parameters

Complete a copy of this section for **each** spectrum, including calibration spectra, submitted in this data record.

❶ | **1.** Spectrum # - *Number the spectra in the data record serially from 1. Enter the number of this spectrum.*

5

❶ | **2.** Suggested Publication Status of this Spectrum

☐ **Print** in *Surface Science Spectra* ☒ Enter in AVS electronic database only

❶ | **3. Spectrum** Filename - *Enter the filename of this spectrum as designated on the magnetic media submitted.*

CuCl2_5

0 [4. Is this a Calibration Spectrum?

☐ Yes ☒ No

❶ | **5.** Parameter Set # to Use - *Provide the number identifier (Field 1, Section E) for the set of instrument parameters used to measure this spectrum.*

3

❸ | **6.** Date -- *Enter the date that the spectrum for this region was measured, The format is YYYYMMDD.*

19890202

❷ | **7.** Species **Label** - *Provide the symbol for the element being measured in this spectral region, e.g. Cl, N, etc. More than one element may be represented. If this is a survey spectrum, enter "survey."*

C_

❷ | **8.** Transition **Label** — *Record the core-level transition that is producing this spectrum, e.g. "KLL" for AES, "2p" for XPS, etc. List the corresponding transitions in the same order as you listed the elements in Field 7 above. If the spectrum is a survey scan, enter "survey."*

1 s

❺ | 9. Spectral Region Comment - *Enter comments describing the spectrum more Lilly when the element and transition do not adequately characterize the spectrum. For example, provide information about critical* experimental *variables (temperature, etc.) that should be emphasized or provide comments on the identification of peaks arising from multiple chemical states, satellites, interference between peaks, etc. in the spectrum.*

,0110. Abscissa **Label** – *Check the appropriate box for the energy axis.*

☐ **Kinetic Energy** ☒ **Binding Energy**

❶ | 11. Abscissa Values – *Enter the energy, in eV, of the first data point displayed on the left in the spectrum plot and the* energy *increment, in eV/channel, used in the energy scan of this spectrum. For display purposes, Auger kinetic energies will increase [rem left to right (positive increment value), and XPS binding energies will decrease going from left to right (negative increment value).*

294.9	-0.117
Starting Value	**Increment Value**

❶ | 12. Ordinate Label - *Specify they axis label, such as intensity, etc.*

Intensity

❶ | 13. Ordinate Units – *Specify the units of signal in each channel, such os "arbitrary units," "counts," "counts/see," etc.*

Counts

❶ | 14. Number of **Data Channels** – *Specify the number of channels used to measure the spectrum.*

128

❷ | 15. Number of **Scans** - *Specify the number of times the signal for a given channel was counted.*

10

❷ **16.** Signal Mode - *Check the appropriate box to identify the data acquisition mode: direct for an analog signal measurement that is then digitized; V/F for an analog signal digitized using an analog-to-digital converter; pulse single for single-channel pulse counting; multichannel direct for analog measurement using a position-sensitive detector; and multichannel indirect for a multichannel detector with photon conversion.*

☐ Direct Analog ☐ V/F Analog ☐ Pulse Single Channel ☒ Multichannel Direct ☐ Multichannel Indirect

.0117. Equivalent Simultaneous Channels – *Enter "1" for a single-channel detector. For a multichannel detector, enter the number of channels in the spectrum covered by the width of the detector.*

128

❷ **18.** Seconds per Scan - *Enter the time needed for one scan in seconds.*

60

❷ **19. Total Seconds this Spectrum** – *Record the total elapsed time used to acquire this spectrum in seconds.*

600

❹ **20.** Time Correction – *Record your *system dead time." For a positive value, the count rate should be corrected by dividing count rate by*

[1- dead time) x (time/channel)

For a negative value, the correction is

exp.(measured count rate) x (dead time}

None

0121. **Signal** Modulation Method – *Check the appropriate field for the signal modulation. Describe any tailored modulation function in Field 2, Section H. Note that only "raw" data, not computer-differentiated data, should be submitted.*

☒ None

☐ Sinusoidal *[sinusoidal modulation/ demodulation)*

☐ Tailored *(using special modulation function)*

☐ Beam Blanking *(chopped beam modulation)*

☐ Beam Amplitude *(modulated beam strength)*

Q **22. Lock-in Parameters** – *Complete only if appropriate.*

Peak-to-peak amplitude of the modulation in eV or nA

Modulation frequency of the reference signal in (Hz)

Time constant of the lock-in amplifier used in seconds

H. Analysis Methods

Q | 1. Energy Scale Correction - *Discuss energy scale calibration and energy shifting used to compensate for charging, if any.*

~~None~~, Referenced to the adventitious hydrocarbon C 1s peak at 284.6 eV.

❸ | 2. Intensity Scale Correction – *Discuss any function applied to the spectral intensities to adjust the peak amplitudes reported.*

None.

❸ | 3. Peak Shape and Background Methods – *Describe the technique used for background correction, e.g. linear subtraction, Shirley function, Tougaard function, Fourier transform cutoff, etc. Describe the procedure used to fit the spectral lineshape, e.g. Gaussian, Lorentzian, Voight, Doniach-Sunjic, etc., and to measure peak amplitude.*

Shirley background subtraction is used in the least squares fitting. Peak positions and widths are determined from least squares fitting using the standard SSI software. The peak shape is fixed to a mix of 80% Gaussian - 20% Lorentzian with an asymmetry parameter of 0.

❸ | 4. **Quantitation Method** – *Specify the method used to determine the values for the atomic concentrations for the analyzed region. Please cite references for the quantitation method in the bibliography (refer to Field 11, Section A).*

Sensitivity factors are from the standard SSI software. The peak areas are the areas above a linear background. The composition was calculated using the standard SSI software, using the intensities measured in the survey scan.

I. Spectral Features Descriptions

❷ 1. **Major** Elements - *List the principal elements identified in the spectra submitted in this record.*

Cu, Cl

❷ 2. Minor Elements — *List the trace elements identified that appear in the spectra in this record.*

C.

The **following** three fields define the quantitative **portions of the feature table on the next page.**

❸ 3. **Peak** Amplitude Method

☐ Peak Height' ☒ Peak Area

❸ 4. **peak** Amplitude Units

☒ Total Counts ☐ Counts/sec ☐ Normalized to a selected peek intensity ☐ eV x counts ☐ eV x counts/sec

❸ 5. Concentration Units

☒ Atomic% ☐ Weight% ☐ Monolayers ☐ mg/m^2 ☐ Other

❷ | & **Table of Spectral Features** — *Enter in the table below all the transitions identified in the spectra. Use care to enter the appropriate number of significant figures. [For example, the entry 283.2 is not the same as 283.20.] If desired, the computed uncertainty may be entered with a value (e.g., 283.20 ± 0.05). The peak amplitude method and units for peak amplitude and concentration are those entered on the previous page. The sensitivity factors are those used for the transition in the quantitation, and the last column is for a brief comment on the peak assignment, e.g. carboxylate, Mo(IV), etc.*

Spectrum ID#	Element, Transition	Peak Energy, eV	Peak Width (FWHM), eV	Peak Amplitude	Sensitivity Factor	Concentration	peak Assignment
1+2	Cu $2p_{3/2}$	? 3 4 ? 7	2.0	45423	9.748	33. ?	
1+3	Cl 2p	198.9	1.5	21 750	2.395	66.1	Position is the $2p_{3/2}$.
4	Cu $L_3 M_{45} M_{45}$	570.9					

Note: **For purposes of labeling transitions in the published spectra, please annotate the submitted hard copy spectra with alphanumeric peak identifications as you would like them to appear.**

Appendix: Contributors' Comments

Comments for the Editors – *Please add any* comments *or suggestions you might hove concerning this form or Surface Science Spectra. We value your feedback.*

Checklist - *A complete submission must include the following:*

Completed AES/XPS Contributors Form (3 copies). ☒

Herd copies of all spectra (3 copies). ☒

Digitized spectra on magnetic disk. ☒

Record the disk characteristics below:

Medium (e.g. high-density 3.5" floppy). 3,.5" floppy, 800K

Doto Format (e.g. PHI: .DIF files). HP LIF

Data File Source (e.g. MS-DOS, HP BASIC]. HP BASIC

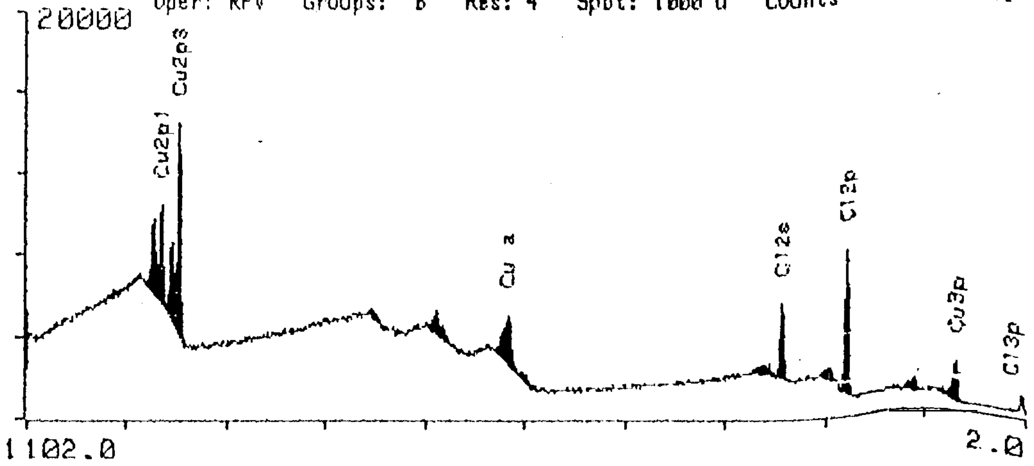
End of the AES/XPS Contributors Form.

Tuesday 11/30/1993
14:21:34
CuCl2 pressed into In

(1) CuCl2_1

# of Scans 1
Flood Gun 0.0
eV 1100.93
Counts 3861

Oper: RPV Groups: 8 Res: 4 Spot: 1000 u



Survey

SURFACE COMPOSITION TABLE
CuCl2_1
CuCl2 pressed into In

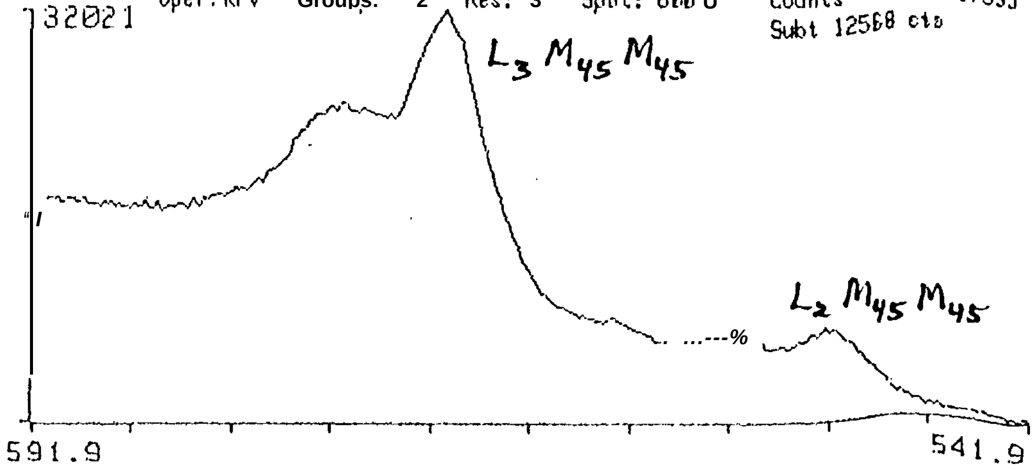
Elem	Corr'd BE	Flood Gun	Delta BE	Sens Factor	# of Scans	eV/ group	Area Area	Relative	Atom %
Cu2p3	935.24	0.0	-4.24	9.748	1	137.5	45423	500575	3^{3} ” ^{9} ^{1}
Cl2p	198.91	0.0	2.09	2.395	1	137.s	21750	975502	66.09

Tuesday 11/30/1993
14:26:13
CuCl2 pressed into In

(4) CuCl2_4

Oper: RPV Groups: 2 Res: 3 Spot: 600 U

\# of Scans 20
Flood Gun 0.0
eV 591.70
Counts 17595
Subt 12560 cts



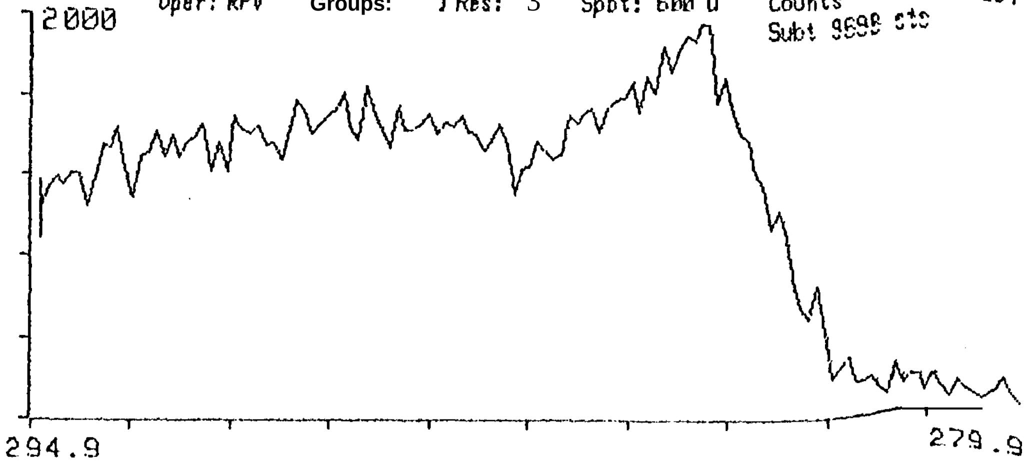
Cu LMM

Tuesday 11/30/1993
14:30:42
CuCl2 pressed into In

(4) CuCl2_5

Oper: RPV Groups: 1 Res: 3 Spot: 600 u

\# of Scans 10
Flood Gun 0.0
eV 294.70
Counts 1034
Subt 9690 cts



C 1s