PSP Vacuum Technology

IPES SYSTEM

INSTRUCTION MANUAL.

Customer:	IMS Japan.
Serial No.	01-0811-ELS Control unit, 100V a.c. 1016 Detector Control Unit 115V a.c. 9002 #701 pre-amp 20251 SPECTRA v8

IPES ELECTRON GUN

1. INTRODUCTION.

The IPES electron gun is a low energy electron source used to excite a sample to produce photons for an IPES experiment

The electron gun consists of a mechanical source mounted on an FC38 (70mm O.D.) flange and an electronic control unit (ELS PSU) to run the cathode and control the beam energy, extraction, and focusing of the beam.

The electron source is bakeable to 150 C and is UHV compatible. The electron optical elements are made from HE30 aluminium alloy, insulators from high alumina, wiring is Ag plated Cu wire covered in Kapton polyimide insulation. Screws and fasteners are from Cu/Be and heat treated stainless steel.

The source is designed to produce a low energy electron beam of approx 0.25eV energy spread (FWHM) in the range 5 to 50eV beam energy. The low energy spread is derived from the use of a BaO cathode which emits at approx 1100K to1200K.

The control unit has a sample current monitor to enable sample current to be measured in the range 10nA to 10uA. A sample bias 0 to +15V is included to suppress secondary electron emission during sample current monitoring.

The beam energy can be programmed remotely with an external 0 to +10V input voltage from a DAC. To perform an IPES spectrum the beam energy is ramped via the SPECTRA data system and SPCI721F pci card.

The electron source is shipped under vacuum or an inert atmosphere by backfilling the shipping housing with Ar. This is a precaution to preserve the BaO cathode.

2. MECHANICAL DESCRIPTION.

The gun consists of 4 main elements.

1. BaO cathode mounted in filament housing.

2. Anode element.

3. Focus element.

4. Earth element assembly.

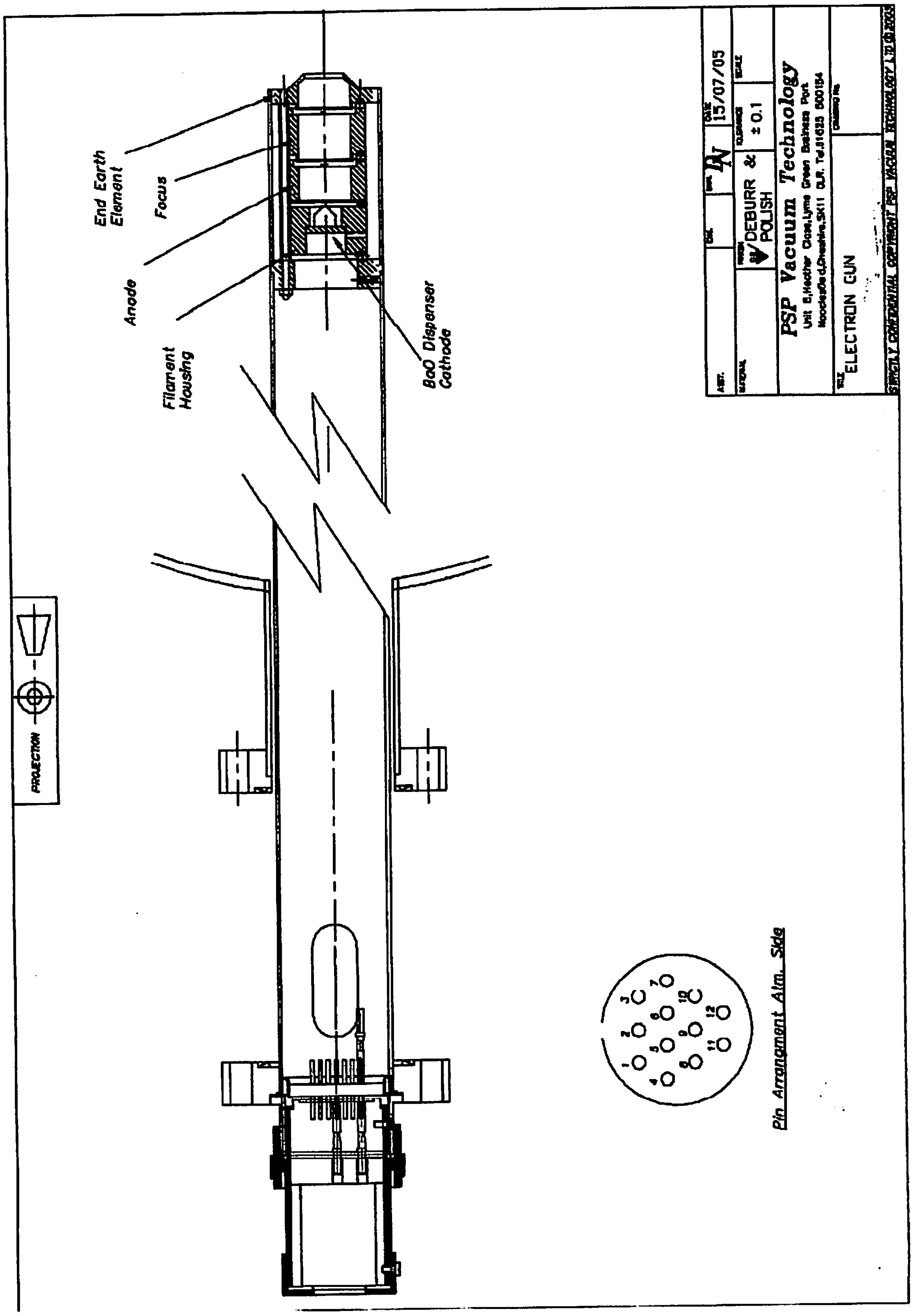
The whole gun assembly is mounted on a stainless steel tube connected to the feedthrough/mounting flange (FC38, 70mm O.D.). A mu-metal shield covers the electron optical assembly to prevent the earth's magnetic field disturbing the electron trajectory at the low beam energies used. The feedthroughs are connected as shown.
The IPES feedthrough/mounting flange is bolted to a 100mm linear retractor mechanism (z100). This allows the gun to be moved towards the sample when taking measurements and retracted out of the way of the sample when not in use to allow access to the sample region when heating, Ar sputtering or performing other experiments.

12-way feedthrough.

see diagram for pin numbering and schematic of gun elements.

Ident.	***Description.***
1	Filament.
2	Filament
3	Filament Housing
4	Anode
5	N/C
6	N/C
7	Focus
8	N/C
9	N/C
10	N/C
11	N/C
12	N/C

The end of gun element is directly attached to earth to maintain a field free region between sample and gun.


End Earth Element
Focus
Anode
Filament Housing
BaO Dispenser Cathode
PROJECTION
Pin Arrangement Atm. Side
1 2 3 4 5 6 7 8 9 10 11 12
DEBURR & POLISH
15/07/05
± 0.1
PSP Vacuum Technology
ELECTRON GUN
STRICTLY CONFIDENTIAL COPYRIGHT PSP VACUUM TECHNOLOGY LTD © 2005

3. ELECTRONICS DESCRIPTION.

The electronic control unit is enclosed in a 19" rack mountable box 3U in height.

3.1 Front Panel.

The front panel has the following features.

1. POWER switch. This is the mains on/off switch which illuminates red when on.

2. KINETIC ENERGY potentiometer. A precision 10 turn pot to set the kinetic energy of the electron beam in the range 0 to 50eV. The kinetic energy is continuously displayed on the KINETIC ENERGY digital panel meter.

3. INT/EXT switch. A switch to allow the beam energy to be set from the front panel KINETIC ENERGY pot in INT position or from a 0 to +10V input from an external source (e.g.. from a DAC) in EXT position. In either case the kinetic energy is displayed on panel meter.

4. FOCUS potentiometer. A precision 10 turn pot to set the focus voltage from 0 to +1x KE V max wrt kinetic energy.

5. ANODE potentiometer. A precision 10 turn pot to set the anode voltage from 0 to +6x KE V max wrt kinetic energy.

6. FILAMENT potentiometer. A precision 10 turn pot to set the filament current from 0 to 1.4A. The filament current is continuously displayed on the FILAMENT CURRENT digital panel meter. NOTE for BaO cathode, the filament current should not exceed 1.20A.

7. WEHNELT. Not used as Wehnelt in IPES gun. The voltage is applied to Filament housing with pot set to 0% (filament middle potential).

8. X DEF. Not used in IPES gun.

9. Y DEF. Not used in IPES gun.

10. SAMPLE BIAS. A precision 10 turn pot to set the sample bias in the range 0 to +15V for use with sample current monitor. **Note that during IPES spectrum measurement the sample bias should be set to 0 otherwise a shift in energy of the spectrum will occur.**

11. KINETIC ENERGY digital panel meter. Displays the beam kinetic energy in the range 0 to 50V.

12. FILAMENT CURRENT digital panel meter. Displays the filament/cathode current in A.

13. SAMPLE CURRENT digital panel meter. Displays the sample current in the range 10nA to 10uA if an isolated sample is connected to rear socket.

3.2 Rear Panel.

1. Mains IEC socket. This is the mains input configured for 240V a.c. A 1A anti-surge fuse is fitted, a spare fuse is also located inside socket.

2. Gun Control 15-way output socket. This is the socket by which the voltages and filament current are conveyed to the gun using the cable provided. The connections are as follows.

15-way socket.

Ident.	*Description.*
A	Y2 deflector Not used
B	Y1 deflector. Not used
C	X2 deflector. Not used
D	X1 deflector. Not used
H	Chassis earth
L	Filament +ve
M	Focus.
N	Anode.
R	Wehnelt (grid). Filament housing
S	Filament -ve

3. Ext Ref. Kinetic Energy input BNC connector. For use with an external 0 to +10V input to drive the kinetic energy from 0 to 50eV with the front panel switch in the EXT position. The signal is on the core of BNC and the signal return on the shield.

4. Sample monitor BNC. For monitoring sample current with the cable provided. Signal is on the core of BNC and signal return on the shield (earth).

5. Earth point. A post with locking nut thumbwheel used to connect the chassis of the unit to the vacuum system.

4. UNPACKING, STORING AND INSTALLATION.

The electron source is shipped inside a sealed shipping cover. The cover has a valve to enable the gun to be evacuated and/or backfilled with inert gas. In this case we have evacuated. This is a preventative measure to minimise contact of the BaO cathode with air.

WARNING.

The Barium Oxide (BaO) cathode consists of a barium oxide coated substrate heated by a tungsten hairpin. The cathode should not be exposed to mechanical or thermal shock which can damage the emission surface. Care should be taken not to expose the cathode to air. Exposure to air allows the oxide to form hydrates, which can cause flaking of the barium oxide.

If the source is not to be used immediately then the gun must be stored in the vacuum housing and either kept under vacuum or under an inert atmosphere such as Ar or dry nitrogen. Similarly if the source is let up to atmosphere on customer's vacuum system, it should be vented using inert gas and kept at a minimum time at atmosphere pressure. If the vacuum system is to be vented for a prolonged time then it is best to transfer the source to the vacuum housing/shipping cover and evacuate and/or backfill with inert gas.

The IPES gun is mounted on a 70mm OD CF flange and is fitted to a z100 linear retractor.

4.1 Initial Inspection.

1. Check continuity of the filament between pins 1 and 2 on the 12-way feedthrough using an ohmeter. Resistance should be < 1ohm.

2. Check all pins do not short to ground or each other (except filament continuity).

4.2 Unpacking.

The IPES electron gun has been cleaned to UHV standards prior to shipment. Unpacking and assembly should be performed in a clean, dust free environment taking care at all times not to touch parts on the vacuum side of the flange except using clean room gloves and demagnetised degreased tools.

To unpack the source: Open valve and vent to dry Ar or N2 gas. Remove the six M6 bolts that secure the housing to the source mounting flange. Carefully lift off the vacuum housing away from the source. The source is now ready to mount to the vacuum system.

4.3 Installation to Vacuum System.

Using a new FC38 copper gasket, bolt the electron gun/z100 onto the chamber. Tighten bolts evenly.

Pump and bake-out vacuum system to obtain UHV conditions.

5. OPERATION.

The electron gun should be installed on a UHV chamber and baked out before operating. The gun should not be operated at pressures above 1×10^{-8} mbar in order to preserve the lifetime of the BaO cathode.

5.1 Degassing. The gun was not particularly gassy on test but it is a good idea to slowly increase the filament current when first switching on. This will help to minimise the possible effects of self poisoning of the BaO cathode.

Ensure that the electronic unit is connected to the mains supply but is switched off. Connect the gun cable 15-way blue plug to the 15 -way blue socket on the rear of the control unit. Connect earth wire flying lead to rear of electronics unit earth point using the ring tag.

Connect the gun cable 12-way connector to the gun 12-way feedthrough. The connector on the cable has a screw which locates in a groove on the feedthrough flange which polarises the connector. Once in position gently push the connector over the feedthrough pins, and rotate the locking bayonet ring clockwise.

Check all potentiometers are set to zero except the X and Y def pots which should be set to 50% (no deflection). Switch on mains to unit with Power On switch, the switch should light red. Slowly increase the filament current to 0.5A. Over a period of 15 mins increase the filament current in 0.1A steps to approx 1.1A, making sure that the pressure does not rise above 1×10^{-8} mbar. Slowly increase the anode voltage to approx 80% (8.0) on dial, focus to approx 50% (5.0 on dial). Increase beam energy to approx 20eV.

5.2 Normal Operation.

Energy range 5eV to 50eV.

Wehnelt voltage 0 (0%).

Anode 80% on dial.

Focus approx 40 to 60% on dial.

Fil Current 1.1A. — 实際は1.0数A 2.0k
Sample current typically:
10uA at 10eV

Lower sample currents can be achieved by reducing filament current.

The gun operates best at working distance of approx 25mm.

WARNING:

The filament normally operates from 1.0 to 1.13A (approx 1050 to 1100K). Do not exceed 1.2A filament current as this will reduce lifetime of the cathode. Small changes in heating current have a greater effect on emission at higher cathode temperatures.

The energy resolution of the beam is largely dependent on the cathode temperature so the lower the filament current the lower the thermal spread of the beam. There are interactions within the beam (Boersch effect) that have an effect on energy spread, the higher the beam current the more electron-electron interaction and higher energy spread.

WARNING.

To prolong filament lifetime it is recommended that currents above 1.13A should not be exceeded for long periods. If the filament poisons resulting in poor emission then it may be cleaned up by running at high filament currents for a small time at 1.2 to 1.24A. This should desorb contaminants from the BaO coated substrate and restore it's normal work function. The filament current used to obtain test data was 1.05A to 1.12A.

5.3 External programming of Kinetic Energy.

To facilitate external programming of kinetic energy from a DAC (or other source), connect a coax cable to **Ext. Ref.** BNC on rear of unit. The core of the coax should be connected to 0 to +10V supply. The screen of the coax should be connected to the return (-ve of external supply). Anode , focus, filament, Wehnelt and x,y settings should be set to those used in INT. control to achieve desired sample current. Switch INT/EXT switch to EXT. position. Set your DAC (or external voltage source) to desired value in range 0 to +10V for 0 to 50eV kinetic energy.

5.4. Turning off.

When turning off the gun, slowly decrease the cathode heating current to 0.0A. Decrease kinetic energy to 0 eV (leave anode, focus, and x, y settings if desired).
Switch off mains to unit.
If the system is to be vented, allow approx 1 hour for the source to cool down to room temperature before venting to dry/inert gas.

IPES DETECTOR.

1. Introduction.

The IPES detector is a bandpass detector designed to detect photons of approx 9.5eV energy with a resolution of approx 0.5eV. The IPES detector consists of a SrF_2 window followed by a Ta cone coated with NaCl. An electron multiplier is positioned behind the Ta cone.
The detector is mounted in a stainless steel tube which shields against stray electrons or ions in the chamber. The tube is welded to a double knife edged flange (70mm OD CF). A feedthrough flange is fitted to one end. There is a small pump out hole in the shield tube at the feedthrough end

There are two electrical connections, the multiplier front (F) has an MHV BNC feedthrough, the multiplier rear (R) has an SHV BNC feedthrough.

The detector has a control unit (IPES DETECTOR) to apply the HT to the multiplier and a pre-amplifier (#701) to recover pulses to the data system.

The IPES detector is mounted on a linear retractor mechanism (z100) which enables it to be moved towards the sample for IPES measurements and moved away from the sample when not in use to provide access to the sample region for heating, Ar sputtering and other experiments.

2. Mechanical description.

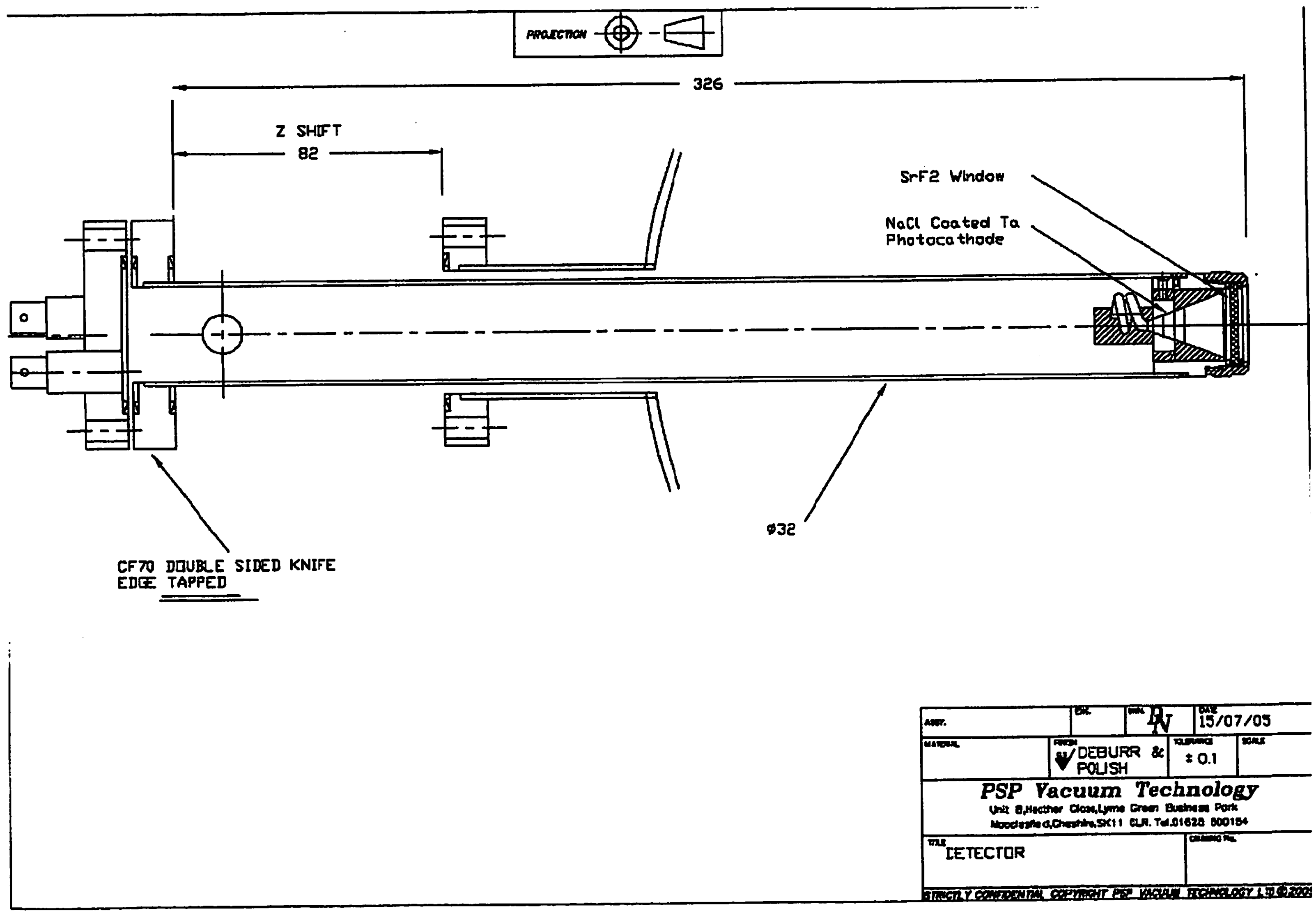
The IPES detector consists of 4 components.

1. Molybdenum mesh. Mounted on the outside of the SrF_2 window to prevent charging in the sample region.

2. SrF_2 window. This is a low pass filter which only allows low energy photons (below 10eV to pass through).

3. Ta cone (photocathode). Photons passing through the SrF_2 window produce photoelectrons from the surface of the Ta. The NaCl coating helps to increase the quantum efficiency. Only the high energy photons that pass through the SrF_2 window produce photoelectrons, this is a high pass filter.

4. Electron multiplier (channeltron). To amplify electrons produced on photocathode.



PROJECTION
326
Z SHIFT
82
SrF2 Window
NaCl Coated To
Photocathode
ø32
CF70 DOUBLE SIDED KNIFE
EDGE TAPPED
15/07/05
DEBURR &
POLISH
± 0.1
PSP Vacuum Technology
DETECTOR

3. Electronics Description.

The IPES Detector control unit is enclosed in a 19" rack mounted box, 3U in height.

3.1 Front panel.

11 Power switch. This is the mains on/off switch and illuminates red when on.

12 Multiplier pot. A 3 turn precision potentiometer to set the HV for the multiplier in the range 0 to 4.0kV.

13 Panel Meter. This reads the multiplier rear HV in kV in the range 0 to 4.00kV.

3.2 Rear Panel.

1. Multiplier Front Bias SHV BNC. Conveys multiplier front bias voltage approx +200V at HV 2.2kV. This connects to IPES Detector Head F MHV BNC with cable provided.
2. Multiplier Rear HV Bias SHV BNC. Conveys multiplier rear HV. Connects to model #701 pre-amp/discriminator HVi/p MHV socket with cable provided.
3. Mains IEC. Configured for 100V a.c. mains input. Fitted with T2A fuse (spare fuse inside).

4. Unpacking, Storing and Installation.

The IPES detector is shipped inside a sealed shipping cover. The cover has a valve to enable the detector to be evacuated and/or backfilled with inert gas. In this case we have backfilled with Ar. This is a preventative measure to minimise contact of the NaCl coated Ta photocathode to air and moisture.

WARNING.

The Ta photocathode is coated with NaCl. Care must be taken to avoid prolonged exposure to air and moisture

If the detector is not to be used immediately then it must be stored in the vacuum housing and either kept under vacuum or under an inert atmosphere such as Ar or dry nitrogen. Similarly if the detector is let up to atmosphere on customer's vacuum system, it should be vented using inert gas and kept at a minimum time at atmosphere pressure. If the vacuum system is to be vented for a prolonged time then it is best to transfer the detector to the vacuum housing/shipping cover and evacuate and/or backfill with inert gas.

The IPES Detector is mounted on a 70mm OD CF flange and is fitted to a z100 linear retractor.

4.1 Initial Inspection.

1. Check there is no short between F MHV BNC and ground.

2. Check there is no short between R SHV BNC and ground.

4.2 Unpacking.

The IPES Detector has been cleaned to UHV standards prior to shipment. Unpacking and assembly should be performed in a clean, dust free environment taking care at all times not to touch parts on the vacuum side of the flange except using clean room gloves and demagnetised degreased tools.

To unpack the source: Open valve to vent to dry Ar gas. Remove the six M6 bolts that secure the housing to the detector mounting flange. Carefully lift off the vacuum housing away from the detector. The detector is now ready to mount to the vacuum system.

4.3 Installation to Vacuum System.

Using a new FC38 copper gasket, bolt the detector/z100 onto the chamber. Tighten bolts evenly.

Pump and bake-out vacuum system to obtain UHV conditions.

5. Operation.

The IPES detector should only be operated under UHV conditions.
Allow detector to cool 24hrs after bakeout.
Connect detector to control unit and #701 pre-amplifier:

Operate SPECTRA data system COLLECT data acquisition program (see relevant section).

Typical operating voltage for multiplier is 2.1 to 2.2kV as indicated on the IPES Detector panel meter. This is approx 1.7 on the multiplier 3 turn dial. The IPES detector works best when as close to the sample as possible, approx 25mm.

PSP MODEL #701 PRE-AMP/DISCRIMINATOR.

Description.

The PSP Model #701 Pre-amplifier is designed to recover pulses from a single channel electron multiplier and give a TTL output that is compatible with the counter on the SPCI721F PC interface card supplied with SPECTRA software. A threshold can be set using the indexed 10 turn pot on the #701 case.

The #701 is powered using +12V D.C. using the power supply provided. The power supply connects to the mains supply 100-240V, 47-63Hz using a standard IEC connector.

Connections, Indicators and Controls.

Here follows a description of the side panel connectors, indicators and control potentiometer from left to right.

O/P A 50 ohm low voltage BNC socket. The TTL output pulse is present at this socket, it connects to the counter unit being used or SPCI721F PCI card (if supplied).

o/p LED A red LED which flashes as pulses are received. At low count rates the LED will flicker and at high count rate the LED will glow continuously. It is used as a guide only to check if pulses are present.

power LED A red LED which glows when the +12V supply is connected and switched on.

Threshold A 10 turn indexed and lockable potentiometer to set the Threshold value. Normally the value is in the range 0.3 to 1.2 (3% to 12%).

POWER i/p A Male jack connector which is the power input socket. The +12V D.C. supply is connected to this socket using the female Jack connector on the cable attached to the power supply.

HV o/p This is the High Voltage output to the electron multiplier rear connection, it also receives the pulses from the multiplier. The cable is high voltage coax with a SHV BNC male plug connector. This connector should connect to the female SHV BNC socket on the IPES detector head that connects to the multiplier rear (R).

HV i/p A High Voltage MHV BNC female socket. This is the input for the multiplier HV supply from the IPES Detector control unit. It should connect to the IPES Detector multiplier rear output SHV BNC using the multiplier high voltage coax cable.

Power Supply.

The Power Solve Model PSE15-312A has a +12V output with a mains voltage input of 100-240V a.c. 47-63Hz. The power supply should connect to the mains using a standard IEC connector. The power supply connects to the Model #701 using the female Jack connector. When the power supply is connected to the Model #701 and is also connected to the mains supply, the **power** LED should glow.

Mounting of Model #701.

The Model #701 is too heavy to be suspended from the multiplier SHV feedthrough on the 70mm O.D. flange. On no account should the weight of the Model #701 be allowed to be felt by the feedthrough.

A bracket is supplied screwed to the body of the Model #701. The bracket should be mounted to UHV system using a bolt or M8 threaded rod. In this way, there is no strain on the vacuum feedthroughs of the multiplier flange.
Note: The Model #701 is not bakeable. During baking of the chamber the Model #701 has to be removed.

WARNING. For safety reasons DO NOT under any circumstances attempt to connect the Model #701 to the multiplier feedthrough when the IPES Detector control unit is connected to the HV I/p socket and turned on. ALWAYS carry out the connection process with the IPES Detector control turned off at the mains. Only when connections are all complete can the IPES Detector control be turned on and the multiplier supply set to the normal value.

Setting of Threshold.

The Threshold is used to discriminate against electronic noise. The Threshold should be set as low as possible to keep the dynamic range as large as possible. Normally the value is between 0.3 and 1.5 on the dial (3% to 15%). To set this level correctly, obtain UHV conditions and cable up the system fully and switch multiplier to 2.1kV to 2.2kV (new multiplier).

Make sure IPES gun is turned off and all other excitation sources are off e.g. UV lamp, electron gun, x-ray source etc. There should only be a few counts per second of noise from dark counts from a multiplier in good condition. Adjust the Threshold pot while the counts are observed, at zero 0% on the dial you may observe some electronic noise, this should disappear to the level of the dark counts as the Threshold is increased to approx 6% to 15%. Make sure that there is no signal from other sources of electrons such as ion gauges etc.

On test at the factory the dark counts from the multiplier were < 1c/s. Threshold set to 12%.

Note that at 100% Threshold no pulses will be observed as all the real signal is discriminated.

SPECTRA SOFTWARE FOR IPES PACKAGE

1. INTRODUCTION.

The SPECTRA data system for IPES spectroscopy consists of COLLECT data acquisition software, SPCI721F pci card for host PC (PC not supplied) and cables to connect to IPES gun ELS PSU and #701 pre-amp/discriminator. The data system controls the beam energy of the IPES gun and receives the channeltron pulses from the IPES bandpass detector via #701 pre-amp TTL pulse output.

The data system is designed to run on a PC with Windows 98 or XP professional with SP1 or SP2. The SPCI721F requires one vacant pci expansion slot in host PC.

The drivers and software are on a cd supplied. A detailed manual of COLLECT software is on the cd in pdf form, please print a copy and keep for reference.

2. INSTALLATION.

(1) PC interface card. Switch off host computer and disconnect from mains supply. Remove cover of computer to gain access to the rear of the computer where the expansion slots are.

Fit the SPCI721F PCI card into a vacant PCI slot in the PC. Ensure the edge connectors are pushed well home and that the external connector blocks are accessible from the rear of the host computer. Fit the MCD connector plate to an adjacent position to SPCI721F. Use screws to secure the metal plate of SPCI721F and MCD connector plate to the computer chassis. Refit cover to PC.

(2) Software. For Windows 98 or XP Professional with SP1 or SP2. .
Install driver for SPCI721F. When the computer is first switched on with the SPCI721F card installed Windows should detect a new hardware (video device). Use the cd supplied to install the driver . Refer to SPECTRA v8 manual on diskette (PDF format) for further information. There is also a readme file on installation diskette to aid installation of driver. The driver should install in two parts, SP721 and unused.
Once the driver has been successfully installed, install the SPECTRA software.

Run setup from cd . It will automatically install SPECTRA to a directory wspectra.and create groups and icons.

(3) Cable up to #701 pre-amp and IPES ELS PSU control.

There is a cable assembly that connects the DAC and counter 1 of the SPCI721F interface card to the IPES gun ELS PSU control EXT ref and the #701 pre-amp TTL pulse output.
The cable has a 15-way D-type male connector and two flying leads with 50 ohm BNC connectors. The 15-way labeled "Computer" connects to the SPCI721F female connector. The BNC labeled "ELS PSU EXT. REF" should be plugged into the rear of the IPES gun ELS PSU. The BNC labeled "#701 O/P" should be plugged into the #701 TTL pulse output socket.

Connect the SPCI721F interface card to the IPES ELS PSU control using the cable provided. The 15-way D-type female connector of the SPCI721F should be connected to the DAC cable that connects to the EXT Ref. of the ELS PSU control. The signal cable should be connected to the TTL pulse output of the #701 pre-amp.

3.OPERATION.

There is a detailed manual to describe the SPECTRA software on the installation cd. It is in pdf format. Please print out and read carefully. The PRESENTS post processing package is mainly for ESCA and has not been included in this package so please ignore this section of the manual.

See SPECTRA manual for full description of Software and SPCI721F interface.

Getting Started.

To open software click on "COLLECT" icon or run spxwlc.exe file in wspectra directory. This will run the COLLECT data acquisition program and present the user with the Display page.

The configuration of the software should be correctly set already, but to check perform the following:

Set configuration of signal source. Click on **Processing Tools** Icon, this brings a pull down down menu, select **Setup Card**. This opens a new window called Interface Setup Menu. Click on Signal Source and select **0 Counter 1**..

Set **Xmax** for IPES gun control. Change **Xmax** to 50eV.

When using the software for the first time, it is a good idea to run the ELS PSU control on the bench (not connected to the IPES gun) to check that it scans in the appropriate energy region.

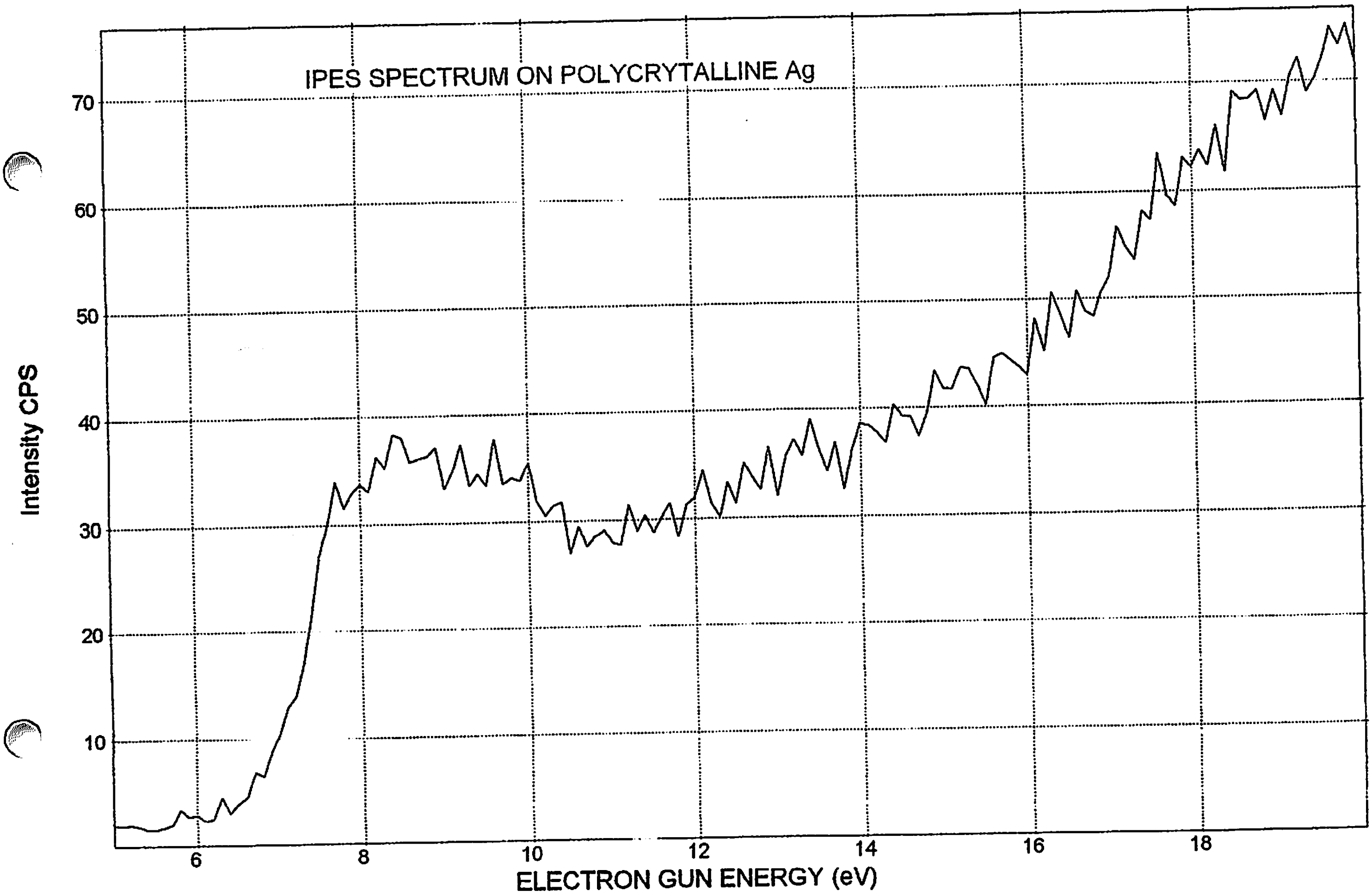
Set up a region(s) of interest by clicking **Edit regions** button. Activate by clicking on region to make it green. Set first energy to 6eV and last energy to 20eV with a step size of 0.1eV. Set swell time to 0.5s. Note pass energy setting is for hemispherical analysers only and is not used with IPES electron gun. Start scan by clicking on GO. Check ELS PSU is moving to correct kinetic energy that was chosen.

If this is OK then perform an IPES experiment. Start with a Ag sample.

Set up IPES gun in INT mode with KE 10eV, fil current 1.08A, anode 80%, focus 50% . The sample current should be approx 5uA.
Set multiplier voltage to 2.1kV- 2.2kV.
Set INT/EXT to EXT. Click on GO to obtain spectrum.

IPES is a low count rate technique. Typically the count rates we obtained on Fermi edge of Ag were of the order of 100c/s. To achieve decent statistics dwell times of 10 or 20 s were required. This can be a combination of repeat scans and/or long dwell times. The spectrum we obtained was using 10 scans at 1s dwell per point. Overall dwell time 10s.

Read manual concerning how to save data and use labooks. Region information can also be saved (scan parameters for up to 10 regions).



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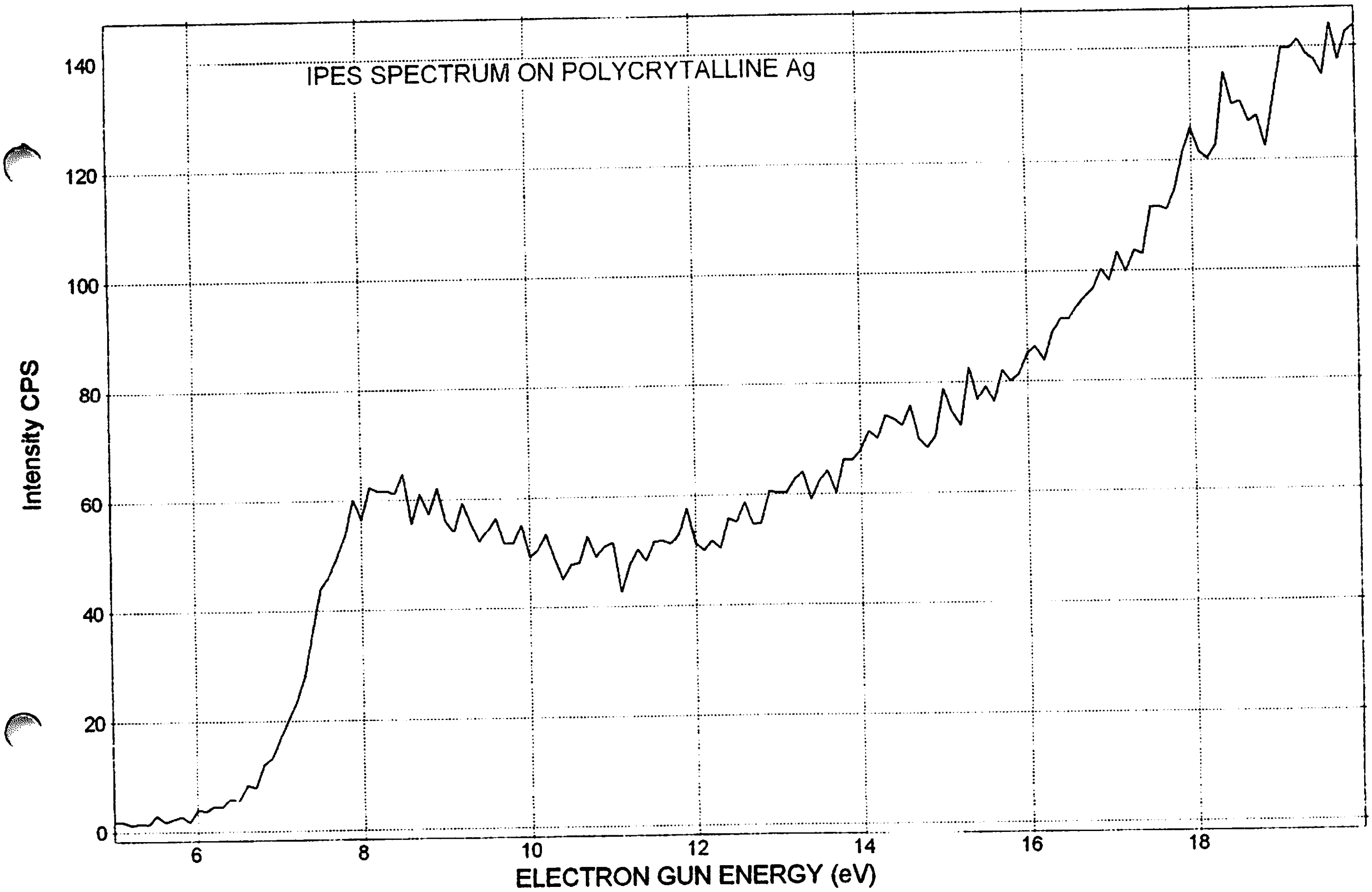
Volume ID : [AgIPES.TXT] Path : C:\PSP DATA\IPES\
Experiment :
Region : -Empty-
From 5 To 19.992 Step=0.1 Scans=10 Dwell=1 Pass=CAE 22

FIL 1.07A
I_{sample} ~ 5μA
FOCUS 50%
ANODE 80%
MULTIPLIER 2.05kV

NO SAMPLE BIAS



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Volume ID : [AgIPES.TXT] Path : C:\PSP DATA\IPES\
Experiment :
Region : -Empty-
From 5 To 19.992 Step=0.1 Scans=10 Dwell=1 Pass=CAE 22

FIL 1.08 A

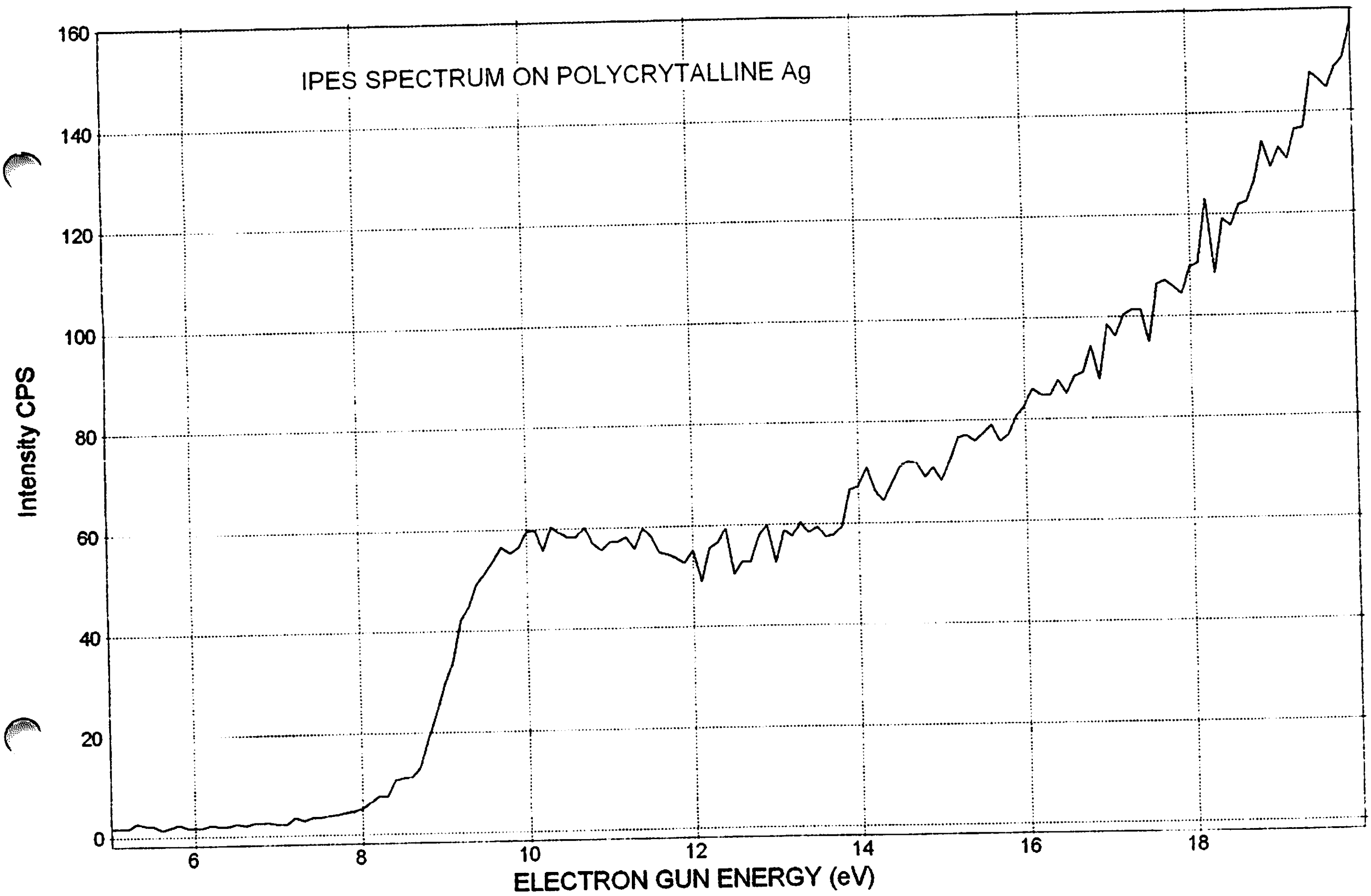
I_{sample} ~ 9.2 μA

FOCUS 50%

ANODE 80%

MULTIPLIER 2.05 kV

NO SAMPLE BIAS



Plot number: 570 on 21/09/2011 14:39:24
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Volume ID : [AgIPES.TXT] Path : C:\PSP DATA\IPES\
Experiment :
Region : -Empty-
From 5 To 19.992 Step=0.1 Scans=10 Dwell=1 Pass=CAE 22

FIL 1.08A
I sample ~ 92 μA
FOCUS 50%
ANODE 80%
MULTIPLIER 2.05kV
−1.55V SAMPLE BIAS