



# PHOTOELECTRON SPECTROSCOPY

## LEADERS IN GAS DETECTION

Since 1977

## Model AC-2

### Features:



- Atmospheric pressure operation (unique in the world)
- Estimate work function, ionization potential, density of states (DOS)
- Measure thickness of thin films on the material surface (less than 20 nano-meters)
- Energy selectable UV source
- Low photo - excitation energy (3.40 - 6.20eV)
- Compact desktop type
- Easy sample introduction and removal
- Full computer control

### Characteristics:

The Model AC-2 is an instrument for Photoelectron Spectroscopy at atmospheric pressure that is an open counter equipped with an UV source.

The open counter is a unique electron detector, which can be operated in open air, and has been used for photoelectron spectroscopy in the air (PESA). By combining the open counter with an UV source, the AC-2 PESA instrument opens the way to a new dimension in surface analysis.

The model AC-2 has been developed from proven technology and incorporates the latest in digital control electronics producing an easy to use, flexible system suitable for all levels of expertise.

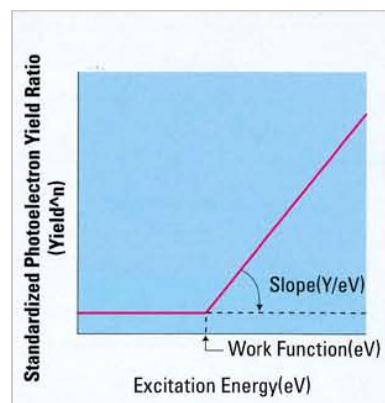
### Basic Features:

When a surface is bombarded with a slowly increasing amount of ultraviolet energy, photoelectrons start to emit at a certain energy level. This energy level is called the "Photoelectron Work Function" or "Work Function".

When the photoelectron output is plotted on an X/Y axis, with horizontal axis as the UV energy applied, and the vertical axis as the standardized photoelectron yield ratio ( $\text{Yield}^n$ , or Y), the result is a line with a specific slope of degree (Y/eV).

#### Note:

1 standardised photoelectron yield ration ( $\text{Yield}^n$ ) is the ratio of photoelectron yield achieved per unit of UV energy (light) applied to the sample surface, where "n" represents the strength of the UV energy applied. The "n" value is reported as 0.5 for metal and as 0.3 to 1 for semiconductor surfaces, based on the ability of the surfaces to emit electrons.



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<b>Model</b>	AC-2
<b>Measuring Principle</b>	Low energy electron counter method
<b>Energy Search Range</b>	3.4 - 6.2eV (364 - 200nm)
<b>Repeatability Precision (Standard Deviation)</b>	Work function 0.02eV      Logarithm counter ratio 0.03logCPC (at 2.7logCPS)
<b>Measuring Time</b>	Approx 5 minutes / 1 sample
<b>Ultraviolet Lamp</b>	Deuterium lamp
<b>UV Spot Area</b>	2 - 4mm square
<b>Spectrometer</b>	Grating type monochromometer
<b>Sample Size</b>	50mm square, Thickness 10mm, 1 sample measurement
<b>Stage</b>	X axis (automatic): 150mm, Z axis (manual): 10mm
<b>Operating Condition</b>	15 - 35°C, Less than 60% RH
<b>Power Requirement</b>	AC100V AC, 50/60Hz, 5A max
<b>Outer Dimensions</b>	AC-2LC1 (Light source Part): approx 600 (w) x 310 (h) x 450 (d) mm AC-2DC1 (Measuring Part): approx 600 (w) x 360 (h) x 450 (d) mm
<b>Weight</b>	AC-2LC1 (Light Source Part): Approx 40kg, AC-2DC1 (Measuring Part): Approx 50 kg

## Main Objects to Measure

### Any sample that emits photoelectrons

- Metal (pure metal, alloy, material containing carbon etc)
- Semiconductors (mono crystal, multi crystal, Amorphous etc)
- Organic material, magnetic material, polarized material, catalysts, pigments, etc
- Ceramics (BN, ZrO<sub>2</sub>, etc)
- Power samples

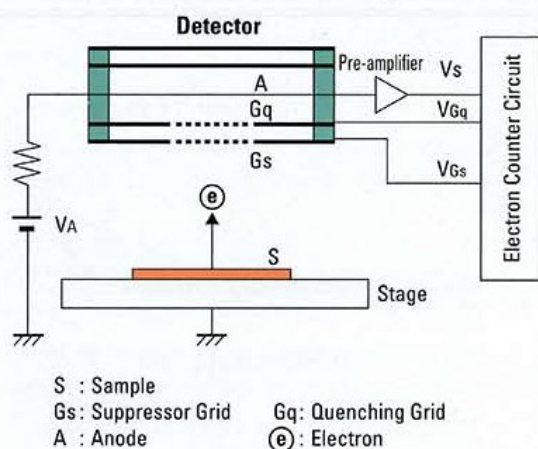
### Samples from which photoelectron emission does not occur

- Ceramics (SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, etc)

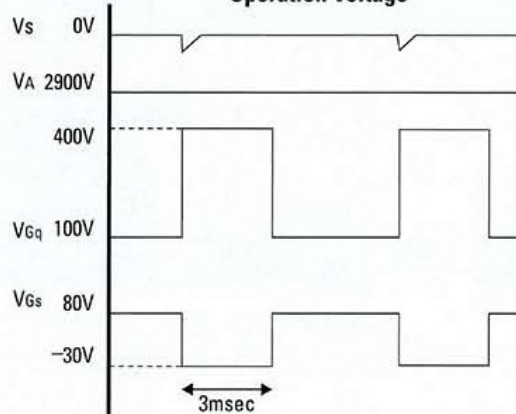
## Main Applications

- Measurement of ionization potential of sensitive materials used in organic EL and photocopying
- Research of surface characteristics of hard discs and magnetic tapes
- Measurement of surface oxidation conditions of semiconductor and lead frames
- Inspecting quality of an MgO film on a plasma display
- Measurement and analysis measurement of work function of materials for Field Emission Display (FED)
- Inspection of contamination at molecular level of precision electronic materials

## Principle Diagram



## Operation Voltage



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