TELEMARK

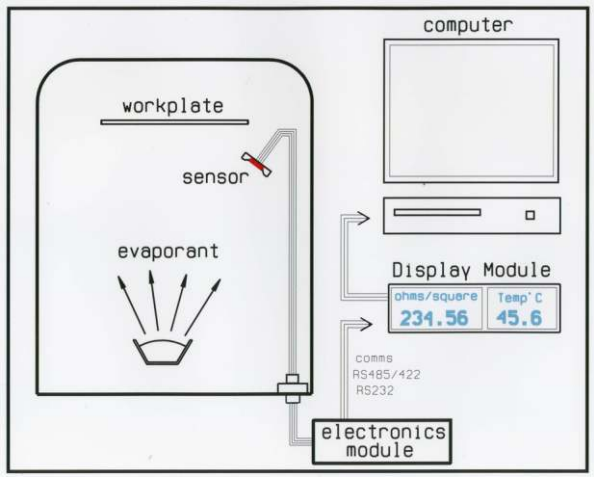
Sheet Resistance Monitor

The Sheet Resistance Monitor (SRM-150) provides in-situ Real Time monitoring of the sheet resistance of electrically conducting films

This device uses a sensor head mounted in-situ within the deposition chamber and strategically located to sample the vapor stream. The device uses the **4-point probe technique** to accurately determine the sheet resistance of the depositing film material.

Features of the SRM-150

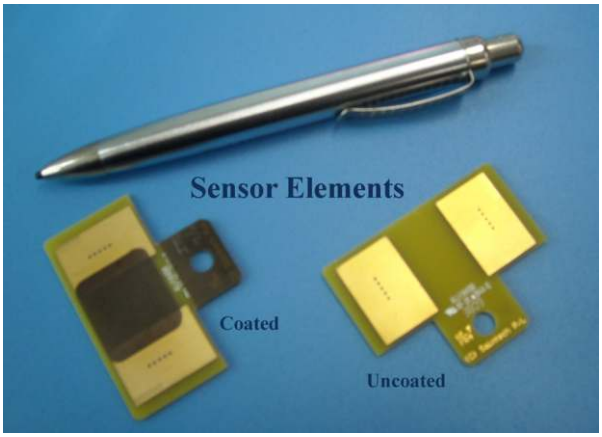
- 4-point probe method of measurement
- **6 decades of resistance measurement** 200kohms down to 200 milliohms
- **Auto-ranging** throughout the entire range
- **Accuracy of measurement 0.5%** for each range
- Data from the **Electronics Module** is relayed to a **Digital Display Unit** or alternately logged to a computer using a special program (optional)
- An **Embedded Thermocouple** monitors the temperature of the substrate during film growth. The sheet resistance can be normalized to room temperature using the (optional) computer program



The Sensor Head

The sensor head incorporates a unique electrode design that uses a replaceable **Sensor Element**. The sensor element can be easily inserted into a slot provided in the sensor head. Once coated, the sensor element requires replacement. The coated sensor element, however, can be used for post-deposition measurements and archiving for quality control purposes.

The sensor head is designed to operate at elevated temperatures to a maximum of 150º C.



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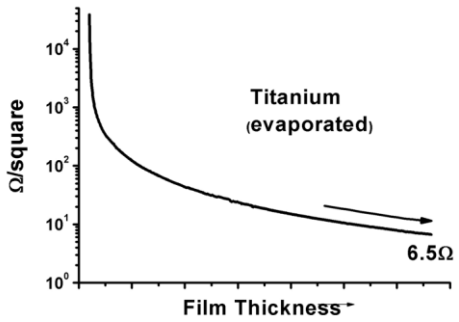
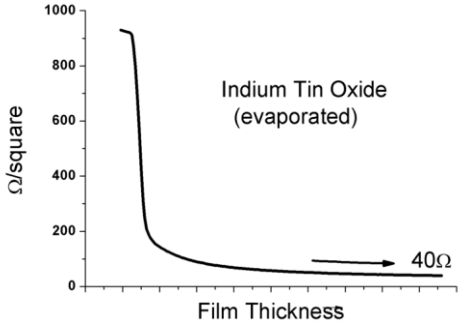
Construction of the Sensor Head

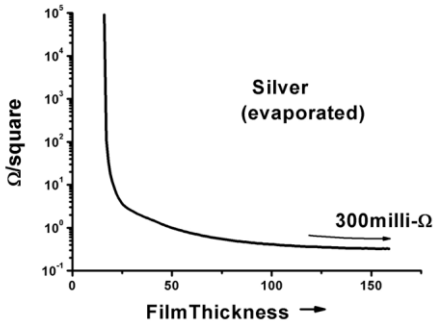
The sensor head is designed to be ultra-low maintenance and is constructed from materials compatible with UHV applications. The sensor head is manufactured from non-magnetic stainless steel and contains four sets of gold-plated spring contacts for maintaining low contact impedances to the sensor elements.
In the standard format, the head can safely operate at temperatures to a max. 150C

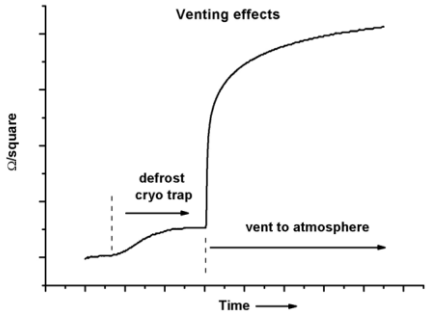
Applications of the SRM-150

The SRM-150 provides real-time monitoring of any electrically conducting films such as metal films (Ti, Cr, Ag, Au, etc) transparent electrically conducting films (ITO, etc) – see examples below







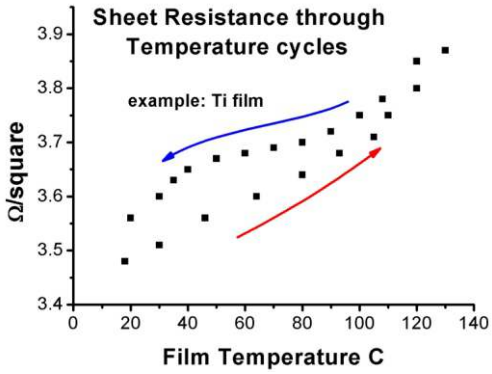


Film Process Studies

Very few thin films behave in an ideal way. The properties of films will often change following deposition and upon venting to air. The data opposite shows the change in sheet resistance that occurs as a result of venting. Post deposition studies will never show these permanent effects.

Thermal Properties of Metal Films

The thermal properties of films can be studied either under vacuum conditions or at atmosphere. The data shown in the plot opposite shows the effect on the sheet resistance through a temperature heating and cooling cycle. It is generally observed that the properties of thin metal films seldom behave as bulk materials.



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