Polartechnics Ltd

Future Materials
Technology for Competitive Advantage

Reducing batch rejection rates in medical device manufacture.

Cervical cancer is an important women's health issue, with 370,000 new cases identified globally, each year. Until now, the main means of determining the presence of Cervical Cancer has been the Pap smear test, which requires samples to be sent to pathology. This is a time consuming and expensive process.

Polartechnics has developed a simpler and reliable alternative to the Pap smear test. Marketed as the Truscan, it utilises both optical and electrical measurements of the cervical tissue, to clearly differentiate between healthy and abnormal cells. Three electrodes take the electrical measurements and the data generated is compared with a normative scale, documented from tissue samples collected from many thousands of women.

The highly sensitive electrodes comprise a polymer core, over the surface of which is "sputtered" (in a vacuum), an extremely thin layer of Titanium. When manufacturing commenced, some batches of electrodes were suffering from capacitance loss, to the point where entire lots of product had to be rejected.

Manufactured samples were submitted to the Future Materials' Facility at the University of New South Wales for comparative XPS (X-ray Photoelectron Spectroscopy) surface elemental analysis.

This analysis quickly identified that minute quantities of contaminates, in the form of Indium and Copper, had been introduced during the sputtering process. In light of these results greater emphasis was placed on the status of the Titanium target employed during the sputtering process.

With the cost per sputtering run being around $3,000, resolution of the low capacitance problem resulted in cost savings well in excess of this amount, where entire lots had to be rejected.

X-Ray Photoelectron Spectroscopy (XPS)

Surface analysis by X-Ray Photoelectron Spectroscopy (XPS) is accomplished by irradiating a sample with X-Ray photons and analysing the energy of the emitted electrons. The key components of an XPS machine are a high vacuum chamber, X-Ray source, X-Ray monochromator, ion gun and energy analyser.

XPS is widely used to determine the chemical composition and to characterise the chemical state of the surface of materials. XPS can be used for all materials that can be subjected to an ultra-high vacuum.

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