CHEMICAL PROBE CARD CLEANING :
an Auger Spectroscopy & Scanning Electron Microscopy Investigation

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Introduction

Probe Card lifetime and device yield are constantly reduced by debris accumulation on the cards' probe tips. While many factors contribute to the frequency of probe needle tip cleaning, cleaning is necessary to insure maximum device yield, to increase probe card life and to reduce PC maintenance costs. Probe cleanliness is of paramount importance to remove the burdens of re-test and so guarantee maximum device yields.

Nucent Ltd. has introduced a range of Chemical Probe Card Cleaning tools (CPCC series) to address the exacting demands of today's test environments, where increasingly small probe tip geometries (15-25µm) are routinely used at low test voltages.
Cleaning is effected using aqueous cleaning by a mild environmentally safe chemical cleaner manufactured by RD Chemical Company - "Probe Wash".
When used in the CPCC tools Probe Wash LC is shown to:

- ▲ Increase Probe Needle Life
- ▲ Increase Probe Yield
- ▼ Remove Oxides and Aluminium debris
- ▼ Reduce Contact Resistance (Cres)

Materials and Methods

To better understand the chemistry of probe card needle contamination and cleaning, and to validate these claims, needles from a cantilever card that had been subjected to 20,000 touch downs were analysed for surface contaminants before and after cleaning in a CPCC 500 tool using ProbeWash

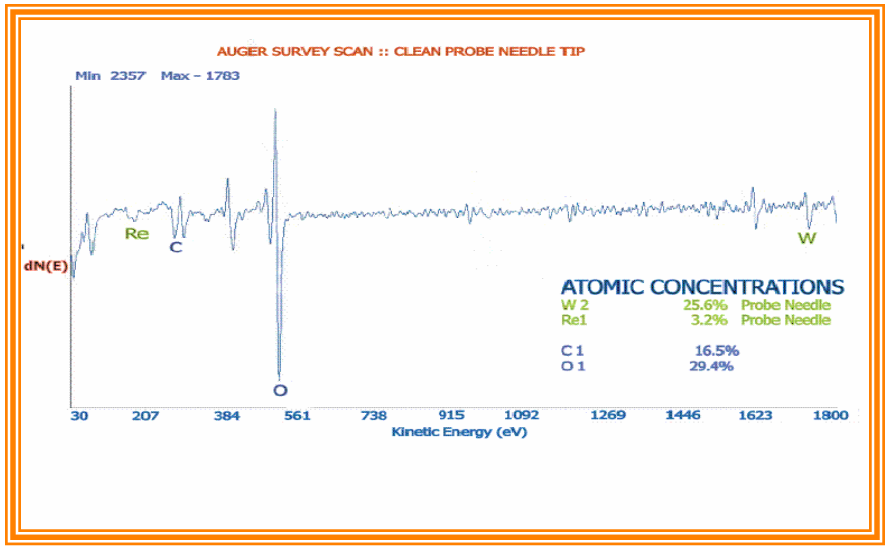
The analytical techniques used were~

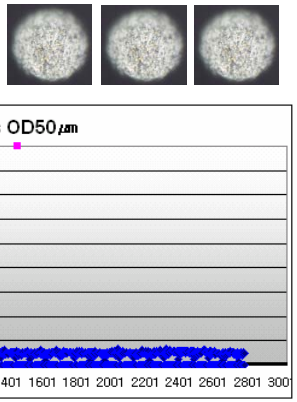
i. **AUGER ANALYSIS :** a surface analytical technique and is specific to an analysis depth of 50 A (5nm)

ii. **SCANNING ELECTRON MICROSCOPY :** a surface imaging technique whereby incident electrons scanned in a raster pattern across a sample surface generate low-energy secondary electrons that are collected and imaged to a CRT.

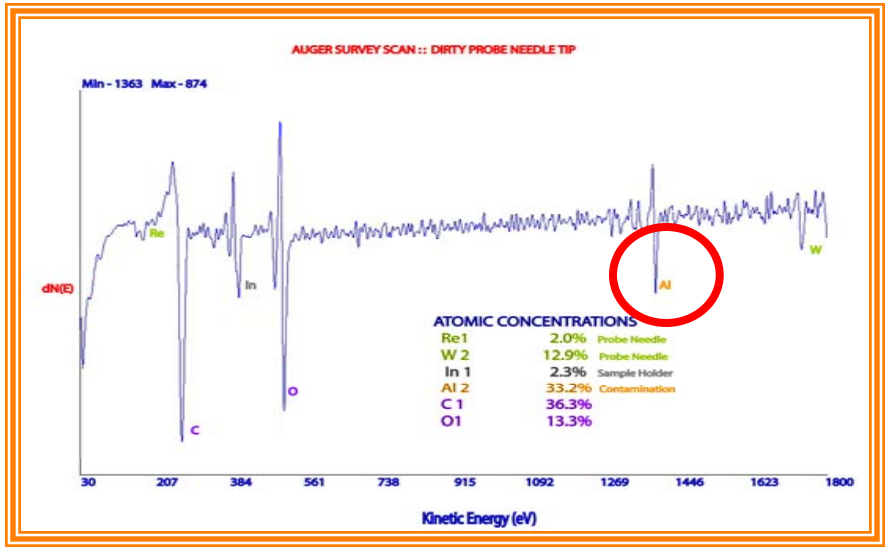
Results

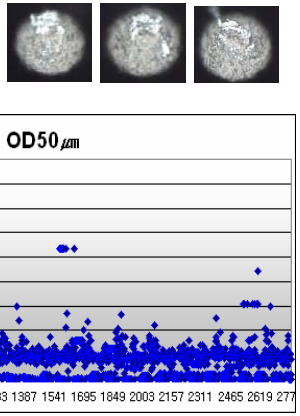
AUGER SPECTROSCOPY





CLEANED PROBE NEEDLE TIPS : Auger Survey Scan

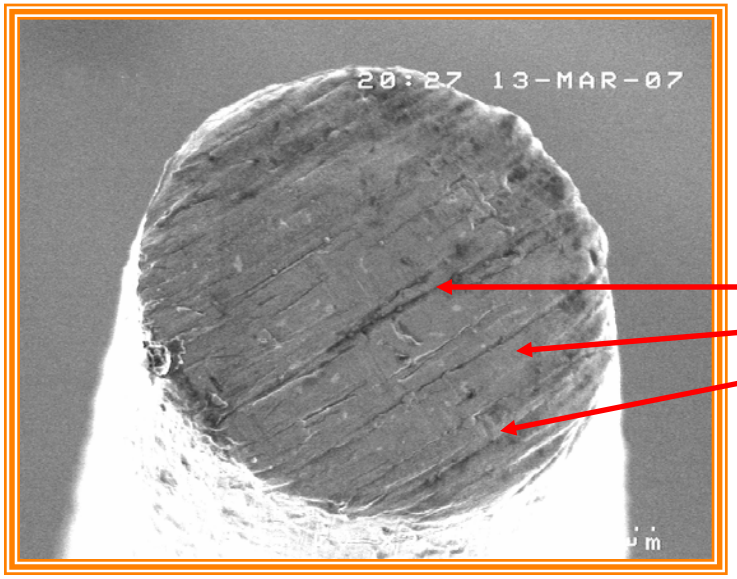




DIRTY PROBE NEEDLE TIPS : Auger Survey Scan

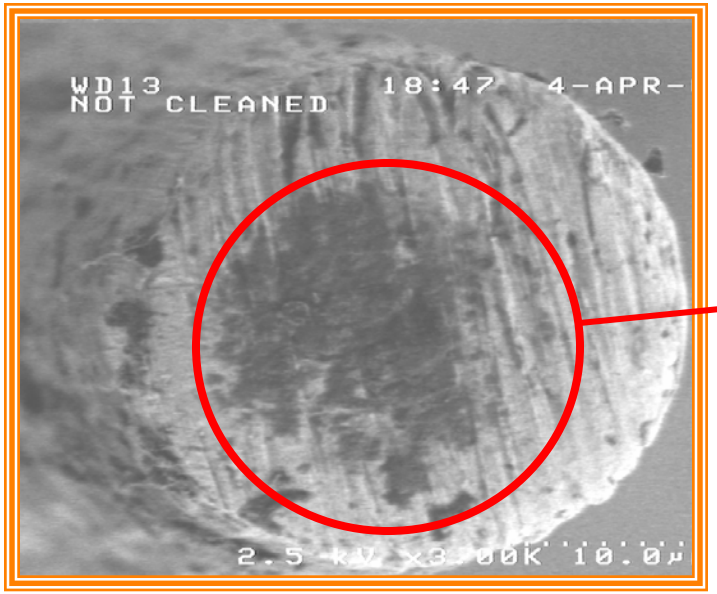
Results

SCANNING ELECTRON MICROSCOPY



Mechanical cleaning damage ***caused by previous abrasive cleaning procedures***

CLEANED PROBE NEEDLE TIPS : SEM Images



Debris accumulation on Probe Tip.
Dark colour indicates lower Z material
c.f. probe composition (W/Re)

DIRTY PROBE NEEDLE TIPS : SEM Images