APPLICATION NOTE   T2O-AN-313

TIN (M13) METHOD

The following application note explains the procedure for the detection of Tin (M13) using the HM3000 Metalyser.

Equipment:

- HM3000 Kit
- WE1 Electrode
- Sn Sample Beaker
- HG1000 Conditioning Solution
- M13 Buffer Solution
- SN45 Standard (4.5ppm)

Getting started:

- Ensure that the latest Metalyser Firmware and method files are installed on the instrument, and that the latest Metaware software is installed on the tablet PC. Detailed instructions for establishing a connection, loading drivers and installing software are provided in the Trace2o HM3000 Field Pro Instruction Manual.

Electrode conditioning:

- Using the polishing equipment, polish the WE1 electrode to a mirror finish and perform a visual check to ensure that no scratches or scuffs are present.
- Connect the electrode to the 'WE1' port on the sonde. Remove the WE2 and WE3 electrodes, if present.
- Half-fill the sample analysis beaker (SAB) with HG1000 conditioning solution and fit to the Sonde.
- Select 'M13 Conditioning' from the 'Measurements available menu' then click 'Condition Electrode' on the Analysis panel.
- The M13 conditioning step will take approximately 10 minutes.
- Once completed, return the conditioning solution to the HG1000 conditioning solution bottle and rinse the Sonde and SAB with the Electrode Rinse Solution and/or deionised water.

Sample preparation:

- Using the supplied syringe, add 7mL of M13 Buffer solution to the Sn Sample Beaker.
- Add 63mL of sample water, either by using a measured volume or by filling the sample beaker to the bottom of the void on the side of the sample beaker.
- Attach the sample beaker to the sonde.

Analysis:

- On the Metaware software, select 'Sn' from the 'Measurements available' menu.
- Ensure that 'Background subtraction' is checked on the 'Control' panel.
- Select 'Standard Addition'. Wait approximately two minutes until prompted to add 20ppb of the standard. When prompted use the pipette to add 280uL of the SN45 standard into the SAB and click 'OK'. The analysis will continue to run for approximately two further minutes, after which two graphs will be displayed in the Metaware window.

Results:

- The graphical data will be displayed. Sn appears as a distinct peak, slight to the left of the centre of the graph. The second graph will show a noticeably taller peak.
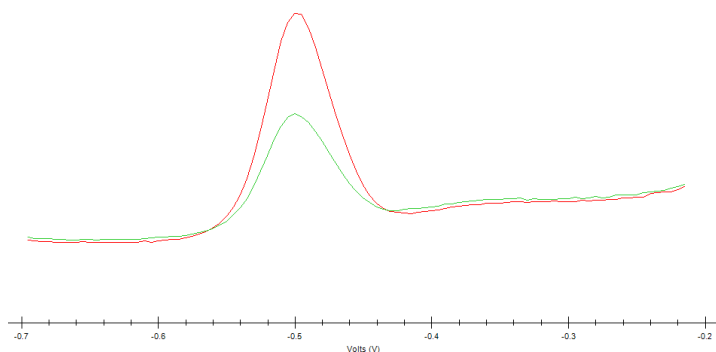
- To determine the original sample concentration, the peak heights must be determined.
- Examine the first graph and identify the 'baseline'. This is an imaginary line drawn from the lowest point on one side of the peak, to the lowest point on the other side of the peak.
- Tap-and-hold on one of the points where the imaginary 'baseline' intersects with the graph. Select 'Calculate Peak', move the stylus to the other point where the baseline intersects with the graph, and tap once.
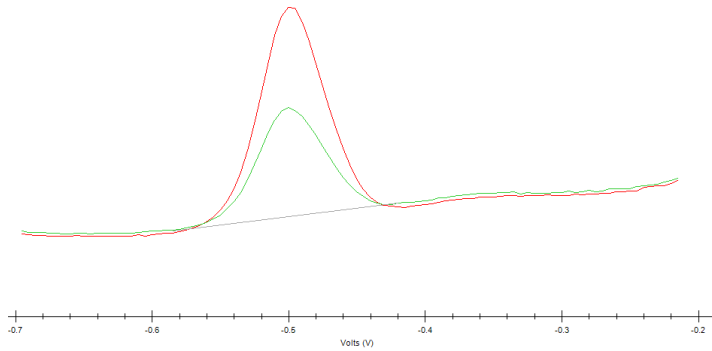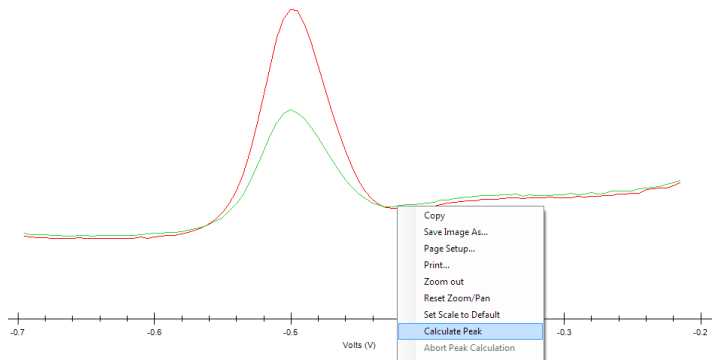
- The baseline should now be drawn on the graph, and the peak height should be displayed.
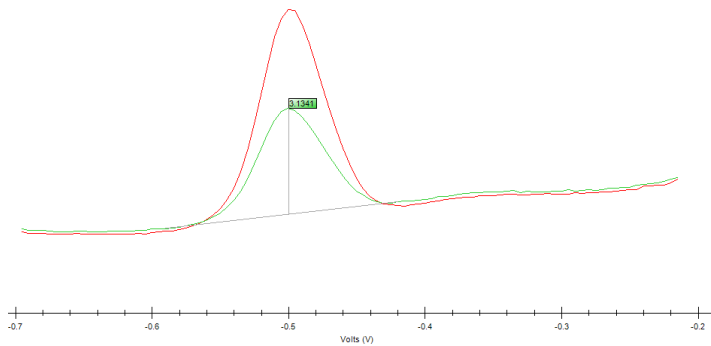
- Repeat the peak height determination process with the second graph.
- Using the Spreadsheet tab as described in the HM3000 Instruction Manual, enter the peak heights (without +/- sign) where directed.
- Enter the addition concentration in ppb (the first line should read 0, as this was the original sample).
- The Spreadsheet tab will now display the original sample concentration in ppb.

- N.B. This instruction provides for a simplified analysis. For further instructions on how to perform a multi-point standard addition, please refer to the HM3000 Instruction Manual.

- The 'Open Files' panel in Metaware will display the date, time and sample water temperature. There is the option to input sample information. Right-click on the individual lines in the 'Open Files' panel and select 'Update Comments' to add information to the file.
- To save the data, select the individual line in the 'Open Files' panel, then click on the 'File' menu and select 'Save Data File'. Navigate to the chosen location and click 'save'.
- The data file will be saved in CSV (comma separated value) format and can be loaded back into Metaware by selecting 'File', then 'Open Data File'.

LOD:

- The Lower LOD is 10ppb; upper LOD is 80ppb.
- To increase the range beyond the upper limit, the sample can be diluted using Ultra-pure de-ionised water. Other water types could introduce contamination.

Notes:

- It is vital to ensure that the correct version of the instrument Firmware is installed. The latest version of the firmware, and the firmware updater software, can be acquired from Trace2o. Follow the on-screen instructions to upgrade the firmware.
- It is vital to ensure that the correct version of the Metaware is installed on the tablet PC. The latest version of the Metaware can be acquired from Trace2o.