CLAIMS

1. A multi-channel analyser for pollutant detection, comprising:

a plurality of electrochemical detection units, wherein each of the plurality of electrochemical detection units is configured to receive a control voltage signal according to a pollutant-specific detection protocol and output a measured current signal based on a measured electrical current from an electrode chip;

one or more processors;

a non-transitory computer-readable memory storing a detection protocol for each of a plurality of pollutants, a characterisation curve for each of the pollutants and computer program instructions executable by the one or more processors to perform operations for pollutant detection, the operations comprising:

identifying a current peak in the measured current signal for each of the plurality of electrochemical detection units;

determining a peak intensity corresponding to the identified current peak; and

determining a concentration of a selected pollutant from the characterisation curve of the selected pollutant based on the determined peak intensity; and

a display configured to display the concentration of the selected pollutant for each of the plurality of electrochemical detection units,

wherein the operations for pollutant detection in respect of each of a plurality of selected pollutants are performed simultaneously.

2. The multi-channel analyser for pollutant detection according to claim 1, wherein each of the plurality of electrochemical detection units comprises a digital-to-analogue converter configured to convert a plurality of control voltages in the control voltage signal into a control voltage waveform for pollutant detection.

3. The multi-channel analyser for pollutant detection according to claim 1 or 2, wherein each of the plurality of electrochemical detection units comprises a current-to-voltage converter configured to convert the measured electrical current received from the electrode chip into a measured voltage waveform.

4. The multi-channel analyser for pollutant detection according to claim 3, wherein each of the plurality of electrochemical detection units further comprises an analogue-to-digital converter configured to convert the measured voltage waveform into a digital voltage signal.

5. The multi-channel analyser for pollutant detection according to claim 4, wherein each of the plurality of electrochemical detection units further comprises a microcontroller configured to convert the digital voltage signal into the measured current signal.

6. The multi-channel analyser for pollutant detection according to any one of the preceding claims, wherein the operations for pollutant detection further comprise:

identifying background current in the measured current signal; and

deducting the background current from the measured current signal before identifying the current peak in the measured current signal.

7. The multi-channel analyser for pollutant detection according to any one of the preceding claims, wherein the detection protocol for each of the plurality of pollutants comprises a screen-printed electrode chip (SPEC) specification, a detection buffer, a dilution factor, a voltammetry mode specification and parameter settings for a selected voltammetry mode.

8. The multi-channel analyser for pollutant detection according to any one of the preceding claims, further comprising a sample loader interfacing the electrochemical detection units, wherein the sample loader comprises a cuvette holder and a screen-printed electrode chip (SPEC) holder in a stacked arrangement.

9. The multi-channel analyser for pollutant detection according to claim 8, wherein the sample loader further comprises a vibration motor attached to the cuvette holder.

10. A computer-implemented method for pollutant detection using a multi-channel analyser comprising a plurality of electrochemical detection units, each of the plurality of electrochemical detection units is configured to receive a control voltage signal according

to a pollutant-specific detection protocol and output a measured current signal based on a measured electrical current from an electrode chip, the computer-implemented method comprising executing via one or more processors the steps of:

receiving the measured current signal based on the measured electrical current from each of the plurality of electrochemical detection units;

identifying a current peak in the measured current signal;

determining a peak intensity corresponding to the identified current peak; and

determining a concentration of a selected pollutant from a characterisation curve of the selected pollutant based on the determined peak intensity for each of the plurality of electrochemical detection units,

wherein the steps for pollutant detection in respect of each of a plurality of selected pollutants are performed simultaneously.

11. The computer-implemented method according to claim 10, further comprising:

identifying background current in the measured current signal; and

deducting the background current from the measured current signal before identifying the current peak in the measured current signal.