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H_2O_2 Measuring Instrument with Amperometric Micro-sensor

Very fast determination of dissolved H_2O_2 without streaming the sensor membrane, display of H_2O_2 in mg/l (%), temperature in °C, pH

The microprocessor-operated measuring instrument has been developed for the fast and accurate in-situ determination of dissolved hydrogen peroxide without any sampling. The instrument is useful for the laboratory and for simple and fast measurements in the field. The instrument is equipped with an amperometric, membrane covered H_2O_2 micro-sensor and with a temperature sensor. The display shows the concentration of the measured dissolved hydrogen peroxide in mg/l (or %), the temperature of the sample and the pH.

The battery-operated measuring instrument can be equipped with a power supply unit and with a RS 232 interface. The H_2O_2 measuring instrument could be changed very simply into a multi-sensor measuring instrument by pulling off the H_2O_2 sensor head and push on a galvanic oxygen micro-sensor tip or a H_2S sensor head.

Furthermore the instrument is useful to store the calibration coefficients of up to 10 different chemical micro-sensors and to calculate the concentration units by means of the measured raw data. This allows also the fast and simple exchange of sensors and measuring ranges, if required. Apart from the already mentioned micro-sensors for the determination of H_2O_2, O_2 and H_2S, there are also micro-sensors available for the determination of dissolved hydrogen and ozone. All these sensors can be interfaced very simply to the measuring instrument. Instead of the temperature sensor an combined pH/temperature sensor could be used if this is required.

The measuring system is equipped with a functional leather case for the whole system with shoulder strap and with belly carrier bag function for easy handling and with a quiver for the sensors. The operation of the measuring instrument is possible without removing the instrument from the bag. This ensures a simple and and protected handling also during field measurements under difficult conditions.

Advantages of the H_2O_2 Measuring Instrument with Amperometric Micro-sensor

Compared with all the other commercially available potentiometric sensors (ion sensitive electrodes) or optical methods for the determination of dissolved hydrogen peroxide and compared with the very expensive instrumentation in case of optical instruments, the new measuring instrument has the following advantages:

1. Determination is possible without sampling and without adding any chemicals within pH 0-11
2. Detection limit of 0,02%
3. High accuracy
4. High economic efficiency (no consumption of chemicals)
5. Fast putting into operation (polarization time of the sensor approx. 5-10 minutes)
6. Measurements also in turbid, coloured, muddy and salt containing samples
7. No cross sensitivities against solids and liquids
8. Online measurement (not only average values of a big volume)
9. No streaming of the sensor membrane necessary, very low analyte consumption
10. High local resolution of the measurement (µm-steps)

Fig..: Amperometric H_2O_2-Micro-sensor, complete with titanium housing, integrated electronics and exchangeable sensor tip

Technical Data of the Amperometric Micro-sensor:

- ☞ Measuring principle: amperometric, membrane covered sensor
- ☞ 3 sensor electrodes
- ☞ Polarisation is managed by the integrated electronics
- ☞ Ready for measurements after polarization time of 5…15 minutes
- ☞ No streaming of the membrane, no stirring of the analyte, very low analyte consumption
- ☞ Concentration ranges: - type I: 0,02-10% H_2O_2
  - type II: 0,1-35% H_2O_2
- ☞ Accuracy of the sensor: ± 1% f.s.
- ☞ Measurements within a range of 0°C to 30°C
- ☞ Measurements within pH 0-11
- ☞ Response time: $t_{90\%}$: 1-2 seconds
- ☞ Average life time: approx. 5...9 months (depends on the samples matrix and on H_2O_2 stress)
- ☞ Pressure stability: 10 bar
- ☞ No cross sensitivities against: carbon dioxide, oxygen, methane, hydrogen, ammonia, carbon monoxide, organic solvents (less than 20% in aqueous solutions), acid acid, dimethyl sulphide, HCN, solids
- ☞ No influence of the measuring signal in case of salt concentrations less than 40 g/l