



Sensor Principle Of Operation

The INTERSCAN voltametric sensor (U.S. Patent number 4,017,373) is an electrochemical gas detector operating under diffusion controlled conditions.

Gas molecules from the sample are adsorbed on an electrocatalytic sensing electrode, after passing through a diffusion medium, and are electrochemically reacted at an appropriate sensing electrode potential. This reaction generates an electric current directly proportional to the gas concentration. This current is converted to a voltage for meter or recorder readout.

The diffusion limited current, i_{lim} , is directly proportional to the gas concentration according to the simplified equation:

$$\frac{i_{lim} = nFADC}{\delta}$$

where i_{lim} is the diffusion limited current in amps, **F** is the Faraday constant (96,500 coulombs), **A** is the reaction interfacial area in cm^2 , **n** is the number of electrons per mole reactant, δ is the diffusion path length, **C** is the gas concentration in moles/ cm^3 , and **D** is the gas diffusion constant, representing the product of the permeability and solubility coefficients of the gas in the diffusion medium.

An external voltage bias maintains a constant potential on the sensing electrode, relative to a nonpolarizable reference counterelectrode in the two-electrode InterScan sensor. Nonpolarizable means that the counterelectrode can sustain a current flow without suffering a change in potential. Thus, the counterelectrode acts also as a reference electrode, eliminating the need for a third electrode and a feedback circuit, as would be required for sensors using a polarizable air counterelectrode.

InterScan sensors are available for

- * bromine
- * carbon monoxide
- * chlorine
- * chlorine dioxide
- * ethylene
- * ethylene oxide
- * formaldehyde
- * hydrazine(s)
- * hydrogen
- * hydrogen bromide
- * hydrogen chloride
- * hydrogen cyanide
- * hydrogen peroxide
- * hydrogen sulfide
- * nitric oxide
- * nitrogen dioxide
- * ozone
- * propylene oxide
- * sulfur dioxide



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