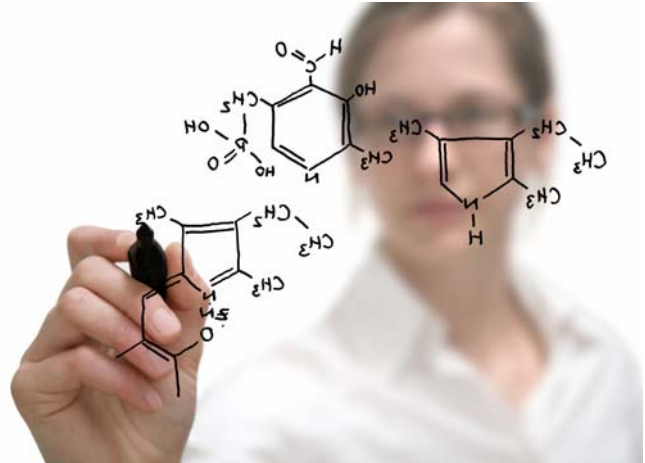


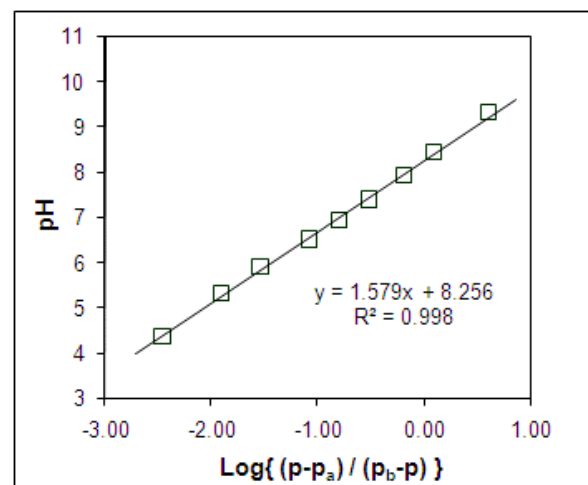
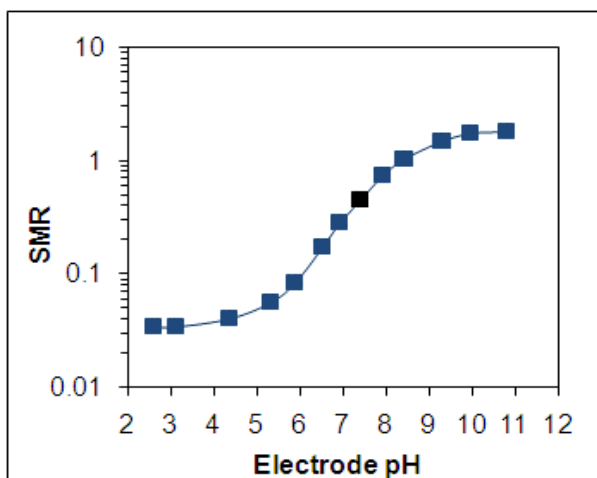
pH

Polestar's optical pH sensors are based on ratiometric measurements of fluorescent indicator chemistries immobilized in a rugged, hydrophilic polymer sensing membrane. Light Emitting Diodes (LED) within Polestar's DSP series Optical Process Monitors generate the light signals used to sequentially excite the fluorescent indicator of the sensing membrane at two select wavelengths yielding the reference and sensing fluorescence signals that are used to determine the pH of the solution being monitored.



The reference signal is generated by exciting the indicator of the sensing membrane at the isosbestic point where both tautomeric forms (protonated and deprotonated) excite with equal efficiency so that the fluorescence emission intensity reflects the total concentration of indicator available for making measurements of pH. The sensing signal is generated by exciting the indicator in the region of the spectrum where only the deprotonated form is excited. The fluorescence signal levels observed during sensing wavelength excitation and reference wavelength excitation are used to calculate a Signal Magnitude Ratio (p) which varies with pH in a predictable manner as described by the Henderson-Hasselbach equation (See Equation 1) wherein p_a and p_b are the Signal Magnitude Ratio observed when the indicator is in the fully protonated and deprotonated forms, respectively.

$$pH = pKa + M * \log \left[\frac{p - p_a}{p_b - p} \right] \quad \text{Eq. 1}$$



Polestar's pH sensing polymer films contain no glass or electrolyte and do not require a reference sensor with easily clogged liquid conjunction such as traditional pH electrodes. Polestar's pH sensors are shipped dry and can be stored dry or wet between uses.



An established high technology company, Polestar Technologies is a recognized leader in the development and manufacture of optical sensors for monitoring oxygen, pH, and carbon dioxide in many different applications, such as biopharmaceutical, food, beverage, brewing, processing, packaging, and water quality.

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