

# ION-SELECTIVE OPTICAL FIBER

## An optical fiber sensor for $\text{Ca}^{2+}$ and $\text{Na}^{+}$ : affordable and disposable ion-selective optodes

Keywords: optical fiber sensor, ion-selective sensor, chemical sensor, optode, plastic optical fiber

### TECHNOLOGY

INO has developed a new sensor technology based on transmission measurements with a specially designed ion-selective multimode plastic optical fiber. The technology allows determination of free ion concentration in aqueous solutions. Ion-selective fiber (ISF) is a multimode plastic optical fiber with a chemically-sensitive cladding. The measuring system is simple and could be used for parallel measurements with several sensors. This technology includes a method of data treatment reducing the need for repetitive sensor calibrations.

### APPLICATIONS

ISF technology is aimed at determination and monitoring of free ion concentrations in aqueous samples on a routine basis in:

- Agrifood
- Wastewater treatment
- Clinical labs

### COMPETITIVE ADVANTAGES

Major advantages of the INO's ISF technology are:

- Low cost and easy replacement of the sensing part
- No need for recalibration in most situations
- Immunity and insensitivity to electromagnetic fields
- Measurement in colored, turbid or opaque media

### INTELLECTUAL PROPERTY

Evanescence wave multimode optical waveguide sensor with continuous redistribution of optical power between the modes, **US 7,864,321**

### STATE OF DEVELOPMENT

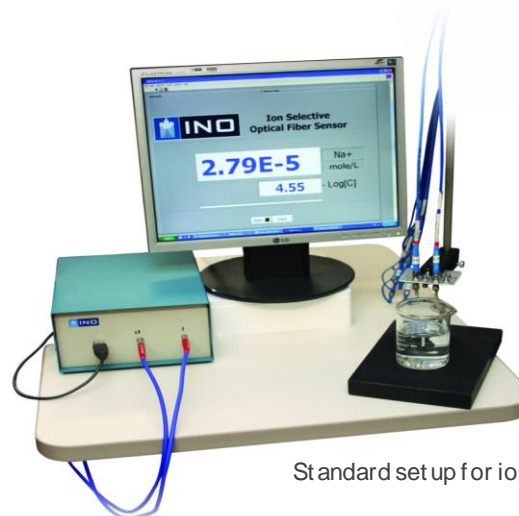
The ISF technology has been developed up to the prototype level. It has been validated for determination of free concentrations in aqueous samples for:

- $\text{Na}^{+}$
- $\text{Ca}^{2+}$

Currently, pH optode is under development. The technology (sensor configuration and software) is ready for advanced prototyping aimed at final product design. Furthermore, other membranes, based on customers needs, can be developed.

### BUSINESS OPPORTUNITY

INO is looking for a manufacturer or an industrial partner having a compatible application to invest in this technology and help bring the ion-selective optical fiber to the level of a commercial device.



Standard set up for ion measurement

### CONTACT

Nathalie Renaud, P. Eng., M. Sc.  
Program Manager, Energy and Natural Resources  
[Nathalie.renaud@ino.ca](mailto:Nathalie.renaud@ino.ca)