Determining salinity using a singlemode tapered optical fiber

ABSTRACT

We report and experimentally demonstrate a salinity determination method by using a tapered single-mode fiber. The change of refractive index due to the exposure of the tapered area to concentrations of Sodium chloride (NaCl) was detected by the wavelength shifts produced in the interference spectral response. Results of the experiment depict that better sensitivity can be achieved at particular waist lengths as the proposed setup managed a maximum sensitivity of 2834.3nm RIU-1 [refractive index range of 1.3324 1.3411] with waist length, L = 15mm, and waist diameter, Ŭ= 10ε The high sensitivity achieved without any coating or modification to the tapered fiber offers simplicity, lesser financial burden, and reliability.

Keyword: Refractometry; Salinity; Tapered fibers; Waist length