

Exploring indicator displacement assays for phosphate detection in seawater

J.J. Breen, Francis J. Radics & Paul Eyo

Providence College

Indicator displacement assays are based on the optical signal modulation of a noncovalently bound indicator upon dissociation by an analyte species. Our work has focused on exploring the lower detection limits for luminescent displacement assays for inorganic phosphate in seawater using complex ions containing two di(2-picolyl)amine ligands (also called DPA or bis(2-pyridylmethyl)amine), each coordinating a zinc cation. Following the work of B.D. Smith and coworkers we have prepared three ligands by covalently attaching two DPA moieties 2,6-bis(chloromethyl) benzene, and 2,6-bis(chloromethyl)-4-methylphenol, and 1,2-phenylenedimethylamine for assays with 6,7-dihydroxy-4-methanesulfonic acid coumarin. We are also dyes that absorb and emit in the visible regions of the spectrum. To date, our limit of detections for a simple fluorescence assay are on the order of 100 ppb in 0.01 M pH 7.2 HEPES and 500 ppb in 0.01 M pH 7.2 HEPES with 0.1 M NaCl.