ACS Sensors Abstract Guide

Objective/Sensing Issue | How this was addressed | Findings

Example of an abstract for a conceptual paper:

A challenge for sensors detecting ultralow amounts of analyte is that for reliable sampling, large volumes of samples must be analyzed. The implication of large volumes is slow response times. Herein, we introduce the concept of utilizing conductive gold-coated magnetic nanoparticles (Au@MNPs) as 'dispersible electrodes', which serve as the active element in the selective capture and direct electro-analytical quantification of analytes. The Au@MNPs are modified with self-assembled monolayers containing a peptide for the selective detection of Cu^{2+}. The particles scavenge any Cu^{2+} in solution and are then magnetically drawn back to the macroelectrode where the Cu^{2+} is detected amperometrically. This concept reduces response times and decreases detection limits by bringing the sensor to the analyte rather than the conventional paradigm of the analyte finding the sensor. The higher sensitivity and lower detection limit is shown to be because all the analyte in the sample is collected, while the shorter response times are because by dispersing the Au@MNPs in solution, the diffusional pathlength of the analyte is drastically reduced.

Example of an abstract for an application paper:

Glycosylated hemoglobin (HbA1c) is an important analyte for monitoring the effectiveness of a diabetic patients treatment regime. However there is no existing HbA1c biosensor for detecting HbA1c that integrates with existing glucose meters. Addressing this challenge, an amperometric immunosensor HbA1c is reported. A glassy carbon electrode is modified with gold nanoparticles (AuNPs) bearing a ferrocene derivative and a glycosylated pentapeptide (GPP) as an epitope to which anti-HbA1c IgG can selectively bind. The rest of the electrode is passivated with an oligo(ethylene oxide) species to give the electrode resistant to nonspecific adsorption of proteins. Complexation of anti-HbA1c IgG with the surface bound epitope resulted in attenuation of the ferrocene electrochemistry. The immunosensor was shown to be able to detect HbA1c in whole blood over the clinically relevant range of 4.6%–15.1% of HbA1c to total hemoglobin using a competitive inhibition assay. The performance of the amperometric HbA1c biosensor was compared with the independent analysis of the same blood sample by a local clinical laboratory with reasonably concordant results.