chemosensors

Editorial

Chemosensors for Ion Detection

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The advancement in chemosensory research towards the ionic species quantitation becomes vital to securing the environment for the future [1–3]. Moreover, such research often leads to advances in developing organic molecules, inorganic materials and hybrid conjugates including small Schiff base molecules, carbon dots (CDs), metal-organic frameworks (MOFs), perovskites (inorganic/hybrid), etc. [4–6]. In this thematic issue, the most recent advances in sensory materials towards biologically/environmentally important ionic species detection and antibacterial/anticancer activities of certain materials are both highlighted and pronounced in great detail. This Special Issue is composed of four review articles and eleven research papers, which extensively covered different materials for the sensing of ions.

Recently, the use of gold nanoparticles (Au NPs) in the test strip-based detection of Hg^{2+} ions has been recognized as a distinct tactic. Komova et al., demonstrated the utilization of mercaptosuccinic acid (MSA) conjugated with a protein carrier (bovine serum albumin) on a pre-impregnated test strip with tween-20 functionalized Au NPs for the detection of Hg^{2+} [7], wherein, the formation of Au-Hg alloys plays a vital mechanistic role. With regard to the employment of BODIPY-based probes, Li and co-workers [8] described the use of three BODIPY-based fluorescent probes for detecting Zn^{2+} with sucessful validation in cellular imaging studies. Rossi and co-workers demonstrated the use of mercaptoundecanoic acid functionalized silver nanoparticles (AgNPs@11MUA) as metal ion sensors (Ni^{2+}, Zn^{2+}, Co^{2+}, Cd^{2+}, Mn^{2+}, and Cu^{2+}) and investigated the role of surface coating density in the sensors [9]. Their work provides valuable information for the research community. Sousa et al., developed the fluorescent CDs from olive mill wastes for detecting the azo dye [10]. These CDs displayed high selectivity to methyl orange (MO) and methyl red (MR) than that of other anionic and cationic azo dyes. Dalapati and co-workers synthesized the supramolecular nanorods by means of the copper ion-induced self-assembly of *N*,*N*-bis[aspartic potassium salt]-3,4,9,10-perylenetetracarboxylic diimide (APBI-K) and adopted them in the fluorometric and colorimetric quantification of sulfide ions [11]. Rahman and co-workers reported the counter ion effect ($SO_4^{2-} > Cl^- > NO_3^-$) on the detection of Cu^{2+} in aqueous solution by using the quartz tuning fork (QTF) sensors modified with L-cysteine self-assembled monolayers [12]. Their report was validated through both experimental and density functional theory (DFT) investigations.

More recently, the use of one-pot synthesized AIEE active Schiff base derivatives as metal ion sensors has become an emerging topic. M. Shellaiah and co-workers reported the one-pot synthesized pyrene-based Schiff base derivative for sequential detection of Cu^{2+} and CN^- [13]. This report also demonstrated the detection of Cu^{2+} and CN^- in cellular imaging, TLC plates, and blended polymer membrane studies. F. Paré and co-workers reported their electrochemical detection of NO_3^- via direct ink writing [14], wherein, graphite-based inks with hydrophobicity were used to avoid the formation of a water layer between the solid contact and the polymeric selective membrane. J. Kumar et al. delivered the utilization of the rhodamine derivative linked silica coated upconverting nanophosphor ($NaYF_4$: $Yb^{3+}/Er^{3+}@SiO_2$-RBDA) for the ratiometric detection of Pb^{2+} [15]. This report has advanced the hybrid NIR-upconverting nanophosphors (UCNPs)-based

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sensory research. P. Shiveshwarkar et al. delivered the spray coating tactic for stimuli responsive materials for the colorimetric detection of Pb^{2+} [16], in which dipicolylamine-terminated diacetylene-containing amphiphiles were spray-coated for detecting the Pb^{2+}. L. Prabakaran and co-workers discussed the use of green synthesized Ag NPs towards the detection of triethylamine and also demonstrated the antibacterial and anticancer activities of the NPs [17]. This report has accelerated the development of the green synthetic pathways for Ag NPs for multiple applications.

Y. Wang and co-workers [18] wrote a thorough review on rhodamine-based chemosensors, which has attracted the scientific community and aids in further advancing research towards novel rhodamine-based molecule development. Their review shows great impact with reliable citation metrics. G. Alberti and co-workers described the use of deferoxamine (DFO)-based materials towards the Fe^{3+} detection [19]. Their review outlines the DFO materials-based Fe^{3+} sensors and includes enough detail to help the researchers working in the field of DFO-based sensors. Shellaiah et al. delivered a review regarding the "Antiaggregation-based sensing utilities of Au NPs and Ag NPs" with highlighted linear ranges, limit of detection (LOD) and mechanistic aspects [20]. Their review can greatly advance research on the anti-aggregation-based sensors. S. Chen and co-workers contributed a detailed review on the pH sensing ability of perylene diimide-based probes [21]. This review, in particular, describes the most valuable information for the design of perylene diimide-based probes in a pH sensing-based study.

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