



Optical Chemo-Sensor Based Organic Probe for Hg (II) Detection in

Contaminated Water



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Abstract

This research focuses on designing and developing a new chemo-sensor tailored explicitly for detecting Hg(II) ions, one of the most hazardous heavy metal ions. The sensor probe, (2-((4-chlorophenyl)amino)-N-(1,3-dioxoisoindolin-2-yl)acetamide (CADA), was successfully synthesized and demonstrated a "turn-off" fluorescence response upon interaction with Hg(II) ions, providing extreme sensitivity. The Isoindole structure of the CADA sensor plays a crucial role in this quenching mechanism. The CADA sensor exhibits unique optical properties, including a significant Stokes shift of approximately 135 nm, which enhances its detection capabilities. Moreover, the sensor demonstrates remarkable selectivity for Hg(II) ions over other cations, making it highly effective for targeted detection. The studied mechanism revealed that the luminescence quenching observed in the CADA-Hg(II) complex is primarily due to an internal charge transfer (ICT) mechanism. This ICT-dependent selectivity is a key factor in the sensor's ability to precisely sense Hg(II) ions. Experimental investigations were carried out in a 1:9 (v/v) ethanol-HEPES buffer solution (20 mM, pH = 7.4) to study the luminescence and UV-Vis characteristics of the CADA probe in the presence of Hg(II) ions. The potential interference from different cations was also examined using a mixture having various metal cations, confirming the sensor's high selectivity. The CADA molecule demonstrated outstanding sensitivity with a low limit of detection (LOD) of 1.025×10^{-7} M, enabling the detection of Hg(II) ions within a narrow dynamic range of 3.416×10^{-7} M to 18 µM. Additionally, the sensor's reversibility was achieved by using ethylenediaminetetraacetic acid (EDTA) as a potent chelating agent, which effectively restored the sensor's fluorescence. This reversibility adds to the CADA sensor's practicality for repeated use in environmental and biological applications. Overall, the CADA sensor's distinctive properties, including high selectivity, sensitivity, and reversibility, make it a promising tool for detecting Hg(II) ions in various real-world scenarios.

Keywords: sensor; mercury; fluorescence; synthesis; optical characteristics; water contamination; fluorophore.

1. Introduction

Mercury is one of the most toxic heavy metals. It has various forms, including elemental mercury (Hg^{0}), (Hg^{2+}), and mercury compounds such as methylmercury [1]. Among these, mercury ions (Hg^{2+}) are particularly concerning due to their high solubility in water, ability to bioaccumulate in the food chain, and potential to cause severe neurological, renal, and developmental disorders [2] The widespread use of mercury in industrial processes, mining, and consumer products has led to its release into the environment, making its detection and monitoring a critical global concern [3]. Traditional methods for mercury ion detection, such as atomic absorption spectroscopy (AAS) [4], inductively coupled plasma mass spectrometry (ICP-MS) [5], and cold vapor atomic fluorescence spectroscopy (CV-AFS) [6], are highly sensitive and accurate. However, these techniques often require expensive instrumentation, complex sample preparation, and skilled operators, limiting their applicability for on-site and real-time monitoring [7]. Recently, there has been a growing interest in developing simple, cost-effective, and portable sensing platforms for mercury ion detection. For example, optical sensors based on organic fluorophores have emerged as a potentially useful alternative because they offer extreme sensitivity, selectivity, and ease of use [8,9].

Organic probes provide a precious candidate for detecting heavy metal ions depending on fluorescence properties. The fluorescence properties of these molecules can be modulated by interactions with particular analytes, such as metal ions, making them ideal candidates for sensing applications [10,11]. In mercury ion detection, organic fluorophores can be designed to change fluorescence intensity, wavelength, or lifetime upon binding to Hg^{2+} , providing a direct and measurable signal for detection. Developing such sensors involves rationalizing fluorophores with high affinity and selectivity for mercury ions and optimizing their photophysical properties for practical applications [12,13].

Fluorescence-based sensing is a powerful analytical technique that relies on the interaction between a fluorophore and an analyte to produce a measurable change in fluorescence properties. The basic principle involves the excitation of a

*Corresponding author e-mail: <u>w.shendy@qu.edu.sa</u>, <u>e.saleh@qu.edu.sa</u> (Wael A. El-Sayed). Received date 16 March 2025; revised date 13 April 2025; accepted date 28 April 2025 DOI: 10.21608/ejchem.2025.368441.11462 ©2025 National Information and Documentation Center (NIDOC) chromophore by excitation at a certain wavelength, followed by luminescence at a longer wavelength. Various factors, including the local environment, molecular interactions, and the presence of quenchers or enhancers, can influence the intensity, wavelength, and lifetime of the emitted light [14,15] In mercury ion detection, organic fluorophores can be designed to undergo specific changes in their fluorescence properties upon binding to Hg^{2+} . These changes can be attributed to various mechanisms, such as photoinduced electron transfer (PET) [16], intramolecular charge transfer (ICT) [17], fluorescence resonance energy transfer (FRET) [18,19] and aggregation-induced emission (AIE) [20]. For example, a fluorophore may exhibit quenching or enhancement of fluorescence intensity upon binding to Hg^{2+} , or it may undergo an alteration in the fluorescence wavelength according to changes in the molecule's electronic structure [21]. The sensor's selectivity is achieved by incorporating functional groups or recognition units with a high affinity for mercury ions, such as thiols, amines, or heterocyclic moieties [22].

The design of organic fluorophores for mercury ion detection involves carefully selecting fluorogenic cores and incorporating mercury-binding motifs. The fluorogenic core is responsible for the molecule's light absorption and emission properties, while the mercury-binding motif provides the necessary affinity and selectivity for Hg²⁺ [23,24]. Common fluorogenic cores used in the design of mercury sensors include coumarins, rhodamines, fluoresceins, and boron-dipyrromethenes (BODIPYs). These cores can be modified with various functional groups to tune their photophysical properties and enhance their sensing performance [25]. One of the key challenges in designing mercury sensors is achieving high selectivity over cations, including zinc (Zn²⁺), copper (Cu²⁺), and iron (Fe²⁺/Fe³⁺). To address this challenge, researchers have developed strategies such as chelation-enhanced fluorescence (CHEF) [26], where the interaction of Hg²⁺ to the sensor molecule significantly enhances fluorescence intensity. Another approach involves using ratiometric sensors, which depend on substantial factors by measuring the ratio of luminescence intensities at two diverse wavelengths [27,28].

Isoindole is an interesting, condensed nitrogen heterocyclic system, and isoindole-based compounds found a variety of applications as essential building blocks for more extended conjugated systems valuable in material science as a high fluorescent material, laser dyes, molecular probes for biochemical experiments, fluorescent sensors, and in various photoelectronic devices [29,30]. In addition, essential pigments and dyes are derived from isoindoles such as phthalocyanine and metal-containing porphyrins [30]. Several fluorescent isoindole-containing mono- and oligomeric structures revealed extensive optical properties since the produced oligomers emitted green light in solution and were blue light emitters with good quantum efficiency [31].

Despite advancements, challenges persist in the development and application of organic fluorophores for mercury (Hg^{2^+}) ion detection. High selectivity in complex matrices, such as environmental water samples and biological fluids, remains difficult due to interfering substances [32]. Toxicity issues of some fluorophores limit their biological applications [33]. The stability and reproducibility of fluorescence-based sensors need improvement for real-world reliability [34]. Future research is expected to focus on creating novel fluorophores with enhanced photophysical properties and integrating complementary techniques like electrochemical and colorimetric methods to improve overall detection accuracy [35]. Organic fluorophores hold promise for developing sensitive, selective, and practical sensors for mercury ions, addressing the limitations of traditional methods [36]. Their integration into portable devices could play a pivotal role in mitigating mercury pollution's (CADA), which detects Hg^{2^+} ions using a switch-off mechanism based on intramolecular charge transfer (ICT). The probe is highly sensitive, selective, reversible, and capable of detecting Hg^{2^+} at low concentrations. Synthesized Isoindole ligands form the basis of this method by monitoring fluorescence amplification during complexation with Hg^{2^+} ions. This innovative approach supports the foundation for detecting Hg^{2^+} and serves as an optical sensor for mercury ions.

2. Experimental

2.1. Materials and Methods

The supporting information file mentioned the chemicals used, solvents, and apparatus descriptions, such as the spectrophotometer, spectrofluorometer, and Stuart SMP30 instruments. All chemicals were provided by Sigma, www.sigmaaldrich.com.

2.2. Preparation of N-(4-phenyl)glycine hydrazide (1)

Scheme 1. introduces the procedure as follows: Ethyl (4-chlorophenyl)glycinate (2 mmole) was dissolved in ethanol (30 mL), and then hydrazine hydrate (2 mL) was added. The mixture was refluxed for 5 hours; then, the solvent was reduced to half its original amount and left to cool at room temperature. The precipitated solid material was filtered, dried, and washed with cold ethanol and then recrystallized from ethanol to give the acyl hydrazide product **1** as a pale-yellow compound see Scheme 1. Reported m.p. 140 °C [38], found 139-140 °C.

2.3. Synthesis of the organic Probe CADA

A mixture of 2-((4-chlorophenyl)amino)acetohydrazide 1 (2 mmole) with phthalic anhydride (2 mmole) was dissolved via worming in glacial acetic acid (10 mL) for 10 minutes. The reaction mixture was then heated under reflux for nine hours and cooled to room temperature. The resulting clear solution was added dropwise to an ice-cold water mixture and left to stand overnight. The precipitated solid was then filtered, dried, washed with cold water, then dried and recrystallized from an ethanol-water (3:1) mixture. Brownish solid; Yield: 52%; m.p. 202-203 °C; IR (KBr, cm⁻¹) \pm 3280 (NH), 3079 (C-H), 1675 (C=O); ¹H NMR (400 MHz, CDCl₃) δ /ppm: 4.06 (s, 2H, CH₂), 6.58 (brs, 1H, NH), 7.17 (d, 2H, *J* = 7.8 Hz, Ar-H), 7.26 (d, 2H, *J* = 7.8 Hz, Ar-H), 7.81-7.91 (m, 4H, Ar-H), 10.48 (br, 1H, NH). ¹³C NMR (100 MHz, CDCl₃) δ /ppm: 56.5, 118.6, 122.5, 124.2, 130.2, 138.4, 138.6, 139.8, 165.2, 172.5.

2.4. Optical experiments

For each of the several metal ions that were studied, particularly Hg(II) and their corresponding equivalents, stock solutions of metal cations were prepared. In a buffer solution that included ethanol-HEPES at a ratio of 1:9 (v/v) and had a pH of 7.4, a luminescence titration was performed with a concentration of 1M for the unreacted CADA. In a water-based solution with a concentration of 1 M, the absorbance spectra of free CADA and those of complexes (CADA-Hg(II)) were analyzed and compared. It is reasonable to suppose that the total volume of free ligand CADA and metal cations amount to 2.0 ml when the absorbance titration is being performed. It is possible to disregard the volume of metal ions when compared to the quantity of free CADA, which is the reason for this. In each experiment, the length of the slits used for excitation and emission was precisely 5 nanometers.

3. Results and Discussions

3.1. Synthesis of the isoindole

The formation of the isoindole product involves a two-step mechanism. Initially, ethyl ethyl (4-chlorophenyl)glycinate reacts with hydrazine hydrate under reflux in ethanol, forming a hydrazide derivative via nucleophilic attack on the ester carbonyl carbon followed by elimination of ethanol. The latter resulted hydrazide then undergoes cyclization with phthalic anhydride in acetic acid at elevated temperatures. This step involves nucleophilic attack and intramolecular cyclization, ultimately leading to the isoindole framework through dehydration. The reaction conditions play a critical role in ensuring efficient product formation and high yield. The disappearance of the signal of the NH₂ in the ¹H NMR and carbonyl frequency type as amide band in the IR spectrum confirms the prop structure. CADA stands out as an ideal sensor for Hg(II) ions due to its high sensitivity, exceptional selectivity in complex environments, and reversible detection mechanism, allowing repeated use. Its fluorescence-based detection method ensures accuracy, while its robust stability and eco-friendly synthesis enhance practicality and sustainability. These features make it a versatile and reliable tool for mercury ion detection in real-world applications.

3.2. Optical properties

The functionalized isoindolyl based organic prop CADA was prepared according to scheme 1 by the reaction of the *N*-arylglycenyl hydrazide **2** with phthalic anhydride which led to the formation of the isoindole derivative prop. In a buffer solution consisting of ethanol and HEPES at a concentration of 20 mM and a pH of 7.4, the newly synthesized chemical sensor was shown to possess distinctive optical features. These qualities were carefully examined. These qualities are shown in Figure 1, which may be found here. At a wavelength of 345 nm, the free CADA sensor exhibits a significant emission peak at 480 nm. This peak is seen when the sensor is stimulated. This fluorescence peak is a representation of the sensor's inherent photophysical features. The absorbance spectra of the CADA sensor exhibit two unique absorption maxima at 247 nm and 300 nm. The absorption peaks seen may most likely be related to electronic transitions, notably transitions between π - π * and n- π *, often observed in aromatic and conjugated systems [39,40]. Furthermore, the occurrence of these transitions highlights the intricate electrical structure of the CADA sensor as well as its potential for interacting with specific analytes.



Scheme 1: Synthesis of the isoindolyl-arylglycenyl hybrid probe.



Figure 1: CADA (a) Absorbance; (b) emission and excitation spectra.

3.3. Analysis of optical characteristics in Response to Hg(II) by CADA

Absorbance and fluorescence spectroscopic techniques were utilized to examine the interaction between the CADA sensor and mercury ions. These methodologies yielded significant insights into CADA's fluorescence response and binding characteristics in the presence of Hg(II) cations. In the absence of Hg(II) ions, the unbound CADA probe displayed two significant absorbance peaks. Nevertheless, the introduction of Hg(II) ions resulted in the emergence of a novel absorbance peak at 296 and 341 nm, signifying the complex based on the CADA molecule and Hg(II) [41], as shown in Figure 2a. As the concentration of Hg(II) ions increased, the absorbance intensity at 300 nm exhibited a progressive decline, indicating the presence of a quenching effect. Concurrently, the absorbance peak at 296 and 341 nm showed a significant alteration: its intensity augmented, a phenomenon referred to as emission enhancement. This alteration signifies modifications in the electronic environment of the CADA molecule because of its interaction with Hg(II) ions. The CADA and Hg(II) ions interaction also formed isosbestic point 287 at 310 nm, as shown in Figure 2b. These isosbestic points prove the chemical changes of the free CADA probe and the CADA-Hg(II) complex, affirming a delineated binding process. The coordinated behavior of the three absorption peaks at 296 nm and 341 nm further substantiates the formation of a stable complex [42]. Moreover, at a longer wavelength of 980 nm, a new peak appeared with an increasing concentration of Hg²⁺. This indicates the presence of the CADA-Hg(II) structure.



Figure 2: (a) The CADA absorbance by gradual addition of Hg(II); (b) The CADA-Hg(II) absorbance within the range of 260-430 nm.

Unexpectedly, the peculiar data of the CADA absorbance spectra offers evidence that the reaction mechanism includes the Hg(II) cations and the active sites, which are composed of oxygen and nitrogen that exist on the structure of the CADA probe [43]. This is an intriguing finding. It is of the utmost importance to take note of the association that exists between the absorption ratio of the chemical sensor at 296 and 341 nm and the concentration of mercury ion (Hg(II)) through the whole range of 0 to 0.9 M (Figure 3). The absorbance remains constant even at increasing molar ratios until the concentration of Hg(II) approaches a molar ratio of 1:1 CADA/Hg(II). This occurs when the molar ratio is reached. This is true in situations where the molar ratio is equal. It has been proven via the use of the ratiometric detection approach that the interaction mechanism between Hg(II) and CADA is a stoichiometric ratio of 1:1. The oxygen and nitrogen active sites in the CADA structure are essential for its stoichiometric interaction with Hg(II) ions. These sites function as electron donors, interacting with Hg(II) ions to create stable complexes. This contact modifies the electrical environment of the molecule, resulting in quantifiable alterations in its optical characteristics. The absorbance at wavelengths such as 296 nm and 341 nm shifts due to Hg(II) ion binding facilitates ratiometric detection. The existence of an isosbestic point improves the sensor's precision by offering a reference wavelength at which absorbance remains unchanged, so enabling dependable measurement of Hg(II) ion concentrations. This process underlies the elevated sensitivity and specificity of CADA for mercury detection.



Figure 3: The ratios at 341 and 296 nm (A₃₄₁/A₂₉₆) versus [Hg(II)] relation.

As an additional point of interest, the CADA sensing molecule exhibits luminous properties, with a peak at 468 nm and an excitation wavelength of 345 nm. It is observed that the optical characteristics of CADA display a clear distinction between absorbance and emission, accompanied by a notable Stokes shift ($\Delta\lambda = 135$ nm). Self-quenching is drastically reduced due to the substantial Stokes shift, which is a key component for potential applications. The significant Stokes shift observed in the CADA sensor enhances its fluorescence sensitivity and reduces self-quenching by separating the excitation and emission wavelengths. This separation minimizes reabsorption of emitted light by the sensor itself, which is a common cause of self-

quenching. Additionally, the large Stokes shift allows for clearer detection of fluorescence signals, even in complex environments, improving the sensor's practical applications in fields like bioimaging and environmental monitoring. There was a considerable reduction in the fluorescence sensitivity of the prominent peak at 468 nm because of the gradual addition of Hg(II) to CADA. According to the data presented in Figure 4a, the amplitude of the signal attenuation reached about 54.43%. Moreover, the noticeable emission peak at 468 nm is significantly suppressed when Hg(II) ions are introduced to the CADA probe within a 0 to 1 equivalent concentration range. This can be seen as a consequence of the considerable quenching of the peak. Although this was the case, the fluorescence intensities were stabilized with the addition of about one equivalent of Hg(II) ions. The luminescence titration curve had a nonlinear correlation observed in the fluorescence titration. A complicated ratio of one to one was found to exist between the CADA probe and Hg(II), according to the findings of the absorbance titration. Figure 4b illustrates the ratios of fluorescence intensities of CADA to those of Hg(II). The curve reached a stable state at roughly 18 μ M, suggesting that the complex's formation occurred at approximately 1:1 equivalent. The investigation of the binding between CADA molecules and Hg (II) was conducted under ideal conditions, whereby the absence and presence of various metal ions with a concentration of 1 µM were taken into consideration. Additionally, the CADA probe measurements of the emission intensities showed that there were not many changes between them. As can be seen in Figure 5a, none of the metal ions that were explored for their ability to interfere with the chemical detection of Hg (II) ions had any real influence.



Figure 4: (a) Fluorescence of CADA by addition of Hg(II) in the range of 0-18 μM, λ_{exc} 345 nm; (b) relation-based fluorescence of CADA intensity versus [Hg(II)].

This was the case despite the fact that they were studied for their potential to interfere. It is possible that the chemical sensor may be exploited as a highly selective sensor for mercury (II) because of this. Using plot-based luminescence investigations conducted by Job, the stoichiometric ratio pertaining to the CADA: Hg(II) complex was found [44,45]. Adjusting the concentration of copper ions within a range that went all the way up to 1 μ M was the method that was utilized to generate the Job's plot, which can be shown in Figure 5b. The fluorescence intensity quenching value was found to be at its peak when the molar ratio of Hg(II) was ≈ 0.5 . This finding provides evidence that the CADA and Hg(II) ions formed a complex with a ratio of 1:1 on the atomic scale. Furthermore, this is consistent with the absorbance titration that was carried out. To measure the sensor's sensitivity, the limit of detection (LOD) was calculated to be 1.025 x 10⁻⁷ μ M. This estimation was made on the assumption that the intensity of the emission can be determined with a precision of 1% [46].

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Figure 5: (a) CADA probe emission intensities and the metal ions (I) and complex intensities in the presence of the same metal ions and Hg(II) ions (II); (b) Job's plot of CADA versus Hg(II) ions.

3.4. Ability to reverse

Ethylenediaminetetraacetate (EDTA), a very effective binding reagent for Hg(II) ions, was employed to examine the reversibility of the optical chemosensor based on CADA. An exposure was performed on the Hg(II)-CADA complex solution, which had a molar ratio of (1:1) Hg(II) to CADA and a concentration of 10 μ M. Following this, the solution was combined with an EDTA solution that had an equal molar concentration. Following the addition of EDTA, their molecules began trading CADA molecules, which led to the development of a CADA-EDTA complex virtually immediately after the addition of those molecules. It is interesting to note that the exchange chelation procedure was followed by an increase in fluorescence from the chemical probe CADA that was released. As a result, the fluorescence intensity increased until it reached approximately fifty percent of the intensity of the free form (see Figure 6).



Figure 6: Reversibility of CADA-Hg (II) and EDTA mutually, $\lambda_{ex} = 345$ nm and $\lambda_{em} = 480$ nm, respectively.

Quantum Yield (Q_Y)

The Q_Y of CADA probe was estimated to be 0.17. This value was determined using a standard reference chromophore, quinine sulfate [47], with a known quantum yield of 55% in an aqueous sulfuric acid solution. The estimated uncertainty in the quantum yield measurement was approximately $\pm 6\%$. The quantum yield was calculated using equation S1 Supporting information:

Quenching Phenomenon and Binding Constant

The Stern-Volmer plot is widely used in fluorescence quenching research. When several quenching mechanisms or distinct

fluorophores are accessible to the quencher, the modified Stern-Volmer equation is often used to evaluate such data. This is particularly true in situations with multiple quenching mechanisms.

A typical Stern-Volmer plot involves plotting the ratio of the fluorescence intensity in the absence (F_0) and presence (F) of a quencher against the quencher concentration [Q]. This ratio is called the fluorescence intensity ratio (See Figure 4b). The equation may be expressed as follows:

$$F_0/F = 1 + K_{SV}[Q]$$

Where the Stern-Volmer quenching constant is denoted by the symbol K_{SV} . One possible formulation for the modified Stern-Volmer equation is as follows:

$F_0/F_0-F = 1/A + 1/A.K_b.[Q]$

where F_0 is CADA probe luminescence, F is the CADA-Hg(II) luminescence, Q is [Hg(II)], A is a constant, and K_b is a binding constant.

A linear relationship was introduced by drawing $F_0/(F_0-F)$ versus 1/[Q], and K_b was estimated from α/β (Figure 8). Inferred from the fluorescence titration curves of the CADA probe with Cu(II), K_b , was conducted to be $6.45 \times 10^6 \text{ M}^{-1}$ [48,49]. Due to the linear connection, the Stern-Volmer process seems responsible for quenching. Nevertheless, variations from linearity at greater quencher concentrations can indicate the existence of additional quenching processes or static quenching, depending on the circumstances. The figure here most likely depicts a Stern-Volmer plot for fluorescence quenching. The modified Stern-Volmer equation would be used to analyze the information, especially if there are signs of numerous quenching processes.

The quenching efficiency plateau at around 55% suggests a confluence of variables that restrict full suppression. Partial binding of Hg(II) may arise from steric hindrance or insufficient occupancy of all active sites, inhibiting complete quenching. Competing processes, including static quenching (complex formation) and dynamic quenching (collisional interactions), may overlap, with one prevailing as Hg(II) concentration rises. Moreover, insufficient electrical modulation by ICT may limit the degree of fluorescence quenching, as the charge transfer mechanism may not entirely deactivate all fluorophores. Collectively, these elements contribute to the identified plateau.



Figure 7: Stern-Volmer plot for K_b calculations of CADA-Hg(II).

Conclusion

A technologically advanced and extremely sensitive turn-off mechanism known as CADA has been developed for the purpose of sensing Hg(II) ions and is presently in the process of being manufactured. This was accomplished by employing a chelation approach in an ethanol-HEPES buffer solution with a volume-to-volume ratio of 1:9 and a pH of 20 mM to prevent interference with a diverse array of metal ions. The colorimetric and absorption CADA sensor demonstrated a significant Stokes shift of 135 nm; consequently, the chemosensor offers a unique approach to the development of a chemical probe that demonstrates substantial luminescence fluctuations. The CADA sensor is capable of detecting Hg(II) ions with ease, demonstrating exceptional sensitivity, excellent selectivity, and a detection limit (LOD) of $1.025 \times 10^{-7} \,\mu$ M. A robust linear relationship was demonstrated between Hg ions and CADA when they were present in micromolar concentrations. Quantitative measurements of Hg(II) ions can be conducted by utilizing this connection. The results of the experiments

conducted by Job indicate that CADA is capable of chelating Hg(II) ions at a ratio of one metal to one ligand. The chemical sensor's mechanism, which was investigated, is contingent upon the formation of the CADA-Hg(II) complex molecule and the binding of Hg(II) to the synthetic chromophore of the CADA. In this synthetic CADA molecule, the suppression of emission intensities is caused by the contact of intramolecular charge (ICT) across the CADA to the binding metal ions, as demonstrated by the mechanism of CADA and Hg(II). The quenching of emission intensities is the result of this interaction. It is probable that this chemical sensor, which is derived from a CADA sensor, could provide a distinctive method for the detection of Hg (II) in the environment and for research purposes. This has the capacity to fulfill both functions.

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