Colorimetric and Fluorometric Sensing of Various Carboxyl Anions with dinuclear Ni(II) and Cu(II) Complexes of Polyamine Macrocycles Following Indicator Displacement Assay

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There are various carboxyl anions that play important roles in biological systems, biomedical science, and the food industry. For example, the quantitative information of oxalate in urine is commonly used in the diagnosis of several diseases including hyperoxaluria and vulvodynia. Glutamate can excite cells to death in a process now referred to as “excitotoxicity”. So, it should be present at the right concentration at the right time at the right places. The amount of it in food should be monitored because it is used as a flavor and taste enhancer in food. Citrate is another carboxyl anion whose presence in urine is considered to inhibit the crystallization of calcium salt. Its high concentration in urine indicates the growth of kidney stones and urological diseases such as nephrolithiasis and hypocitraturia. Therefore, the easy and cheap method of quantitative detection of carboxyl anions is important. In our research, several polyamine macrocycles were synthesized by Schiff’s base reaction between 2,2’-diamino-N-methyldiethylamine and various aromatic dicarboxaldehyde in high dilution conditions followed by NaBH4 reduction. Then, these macrocycles were converted to dinuclear Ni(II) and Cu(ii) complexes, and studied for recognition of carboxyl-containing anions by indicator displacement assay using several commercially available dyes Eosin Y, Pyragallol red, and pyrocatechol violet.

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Making it Click: Synthetic Tools for Multi-Stage Diversification

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Modularity enables diversity. Since its inception two decades ago, , "click chemistry" has both embodied this idea and driven innovation throughout the molecular sciences. The key to this strategy, success lies in its simplicity: molecular building blocks are clicked together using , "near-perfect" reactions. We continually seek to harness fundamental principles of chemical structure and reactivity in the pursuit of modular synthetic tools. Recent progress will be discussed.