Anion-Exchange-Induced Modulation of Electric Field Response in a Two-Dimensional Bis(terpyridine)metal(II) Complex Polymer

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Coordination nanosheets (CONASHs) are emerging two-dimensional materials prepared in bottom-up ways via coordination bonds. The high degree in freedom for the choice in ligands and metals results in a rich variety of functionality of the CONASHs.[1] When a framework of CONASHs is ionic, counter ions should be included in the CONASHs. Therefore, in ionic coordination nanosheets, the choice of counter ions gives another degree of freedom in the composition and functions.

Bis(terpyridine)metal(II) complex nanosheets, M-tpy (M = Fe, Co, and Zn), are cationic CONASHs, whose framework features electrochemical and photophysical functions such as electrochromism, redox conductivity, and photoluminescence.[2-4] We previously reported anion-exchange for Zn-tpy with luminescent dye anions and their photofunctions.[4] This result motivated us to investigate new electronic functions of redox-active M-tpy via anion-exchange reaction.

In this research, post-synthetic anion-exchange reaction of chloride-containing Co-tpy. was examined. The chloride anions were efficiently replaced by other anions such as BF_4^- and $[Ni(mnt)_2]^{n-}$ (n = 1 or 2). In addition, the response to electric field of Co-tpy on interdigitated array electrodes (IDAs) was modulated by anion-exchange (**Fig. 1**). The mechanism of these phenomena will be discussed based on the electronic states of the CONASH and the anions.

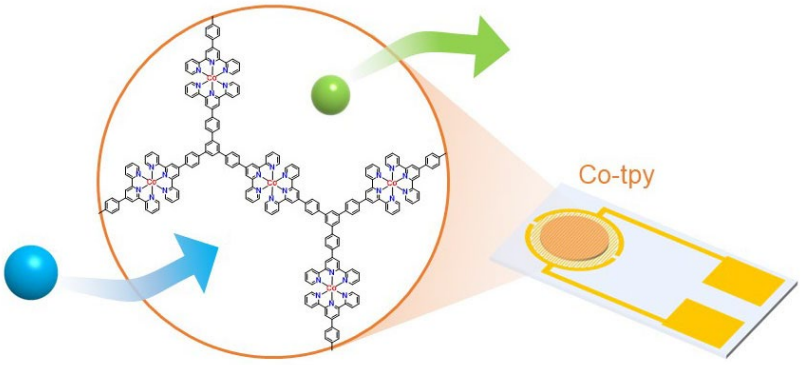

Fig. 1. Electronic field response modulation of Co-tpy via anion-exchange

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