The 282nd MANA Seminar

High-yield Preparation, Chemical Exfoliation and Structural Modification of Layered Transition-metal Hydroxide Nanocones

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Layered hydroxides, consisting of metal-hydroxyl host slabs and/or charge-balancing anions in the interlayer galleries, afford a large variety of functionality and hybrid possibility for potential applications as anion exchangers, adsorbents, catalysts, active electrode materials, drug delivery systems, and photofunctional materials. Generally, layered hydroxides can also be artificially exfoliated into unilamellar nanosheets. The positively charged nanosheets can be employed as functional building blocks to fabricate diverse nanoarchitectures and novel nanodevices with unique functionalities. Herein, we demonstrate for the first time that layered cobalt hydroxide nanocones (NCs) intercalated with dodecyl sulfate (DS) ions can be formed via a facile and reliable synthetic strategy. More interestingly, the current strategy can be extended to the preparation of a large family of layered monometallic (Co, Ni) and bimetallic (Co-Ni, Co-Cu and Co-Zn) hydroxide NCs. Especially, various kinds of layered transition-metal hydroxide NCs can be exfoliated in formamide to prepare unilamellar hydroxide nanosheets with specific composition and function. Furthermore, layered transition-metal hydroxide nanocones can also be transformed into other related structures (e.g., CoOOH, CoO, Co3O4, and NiCo2O4) retaining original morphological features which would endow their potenional application in various fields. These Ncs and nanosheets with controllable transition-metal compositions may be very useful in exploring new magneto-optical or electrochemical devices.

Venue: Auditorium, 1F, WPI - MANA Bldg.,

Date: September 14th, Friday **Time:** 15:30-16:15

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