of Ga$_2$O$_{10}$(H$_2$O) and GaO$_5$ trigonal bipyramids connected via MnO$_4$ at higher temperatures. We observed that the host would become amorphous upon prolonged heating. Interestingly, after exposing to moisture, the dehydrated host could restore to its originally crystalline state with absorbed water molecules being self-assembled into cyclic water hexamers again. The amorphous -to-crystalline transition was able to proceed reversibly via a repeated dehydration / rehydration process. Without heating, we found that water hexamers could still be driven out of host by reacting with terephthalic acid (TA), which could self assemble into infinite supramolecular chains within the host layers. The interchange between (H$_2$O)$_6$ clusters and organic supramolecular entities involved very interesting and complicated guest-to-host and guest-to-guest hydrogen bonding interactions.

References

Keywords: superamolecular chains, zincophosphate, supramolecular chains

---

**P11.15.109**

_Elastic layered zincophosphate intercalated with ice-like water cluster or superamolecular chains_

Yu-Ting Huang, Yueh-Chun Liao, Sue-Lein Wang
National Tsing Hua University, Chemistry, Department of Chemistry, National Tsing Hua University, Taipei, Taiwan, ROC. E-mail: juliantin10@gmail.com

Remarkable discrete water hexamers (H$_2$O)$_6$ have been observed in pseudo neutral layers of amine-anchored zincophosphate host. Molecular structures of (H$_2$O)$_6$-6 have been studied in several reports in which the cyclic topology as well as hydrogen bonding were clearly illustrated. However, no previous work showed that water hexamers could exist in solid-state under ambient conditions. We report here a kind of discrete water hexamers confine in-between zincophosphate strata with a chair conformation. The confined hexamers could sustain heating up to 150°C and then get off the host at higher temperatures. We observed that the host would become amorphous upon prolonged heating. Interestingly, after exposing to moisture, the dehydrated host could restore to its originally crystalline state with absorbed water molecules being self-assembled into cyclic water hexamers again. The amorphous -to-crystalline transition was able to proceed reversibly via a repeated dehydration / rehydration process. Without heating, we found that water hexamers could still be driven out of host by reacting with terephthalic acid (TA), which could self assemble into infinite supramolecular chains within the host layers. The interchange between (H$_2$O)$_6$ clusters and organic supramolecular entities involved very interesting and complicated guest-to-host and guest-to-guest hydrogen bonding interactions.

References

Keywords: hydrothermal, phosphates, transition metal
Nanoporous metal phosphates with photoluminescence property
Ya-Ching Yang, Sue-Lein Wang
National Tsing Hua University, Chemistry, 101, Section 2, Kuang-Fu Road, Hsinchu, Taiwan, 30013, Taiwan, E-mail: jcho1@lsu.edu

For the past two decades, research about metal silicate and phosphate with microporous structure has always played an important role in the field of materials chemistry due to their wide application potential from traditional catalyst, molecular sieve and ion exchange to recently developed low-k materials and zeolitic dye laser. In recent years, we have discovered several gallium phosphates containing transition metal with pore size around 1 nm and intriguing photoluminescence property. For example, 24-member ring NTHU-11 and the first organo-metallo phosphates NTHU-2,2 can emit blue light when excited with UV light. The photoluminescence phenomenon is a new property of nanoporous metal phosphate with emission mechanism apparently different from that of existing inorganic phosphor since the later is doped with metal activator or added with sensitizer in host lattice in order to illuminate. At present, the photoluminescence property of nanoporous metal phosphate is substantiated. Besides blue light, zinc gallophosphate that can emit yellow light or even white light have been synthesized. In this presentation, we are going to present a series of nanoporous gallophosphates and zinc gallophosphates via the synthetic strategy of employing the large 4,4',trichloroethylbenzene (tclmb) amine as a template. Their structures will be described and photoluminescence property will be examined.

References

Keywords: metal phosphate, photoluminescence, nanoporous

Crystal growth, structure and physical properties of Ln(CuGa)_{13} compounds (Ln = La-Nd, Eu)
Jung Young Cho1, Cigdem Capan1, Amar B Kariki2, D. P. Young1, Evan L. Thomas1, W. Wong-Ng1, Yusuke Nambu1, Satoru Nakatsuji1, Julia Y. Chan1
1Department of Chemistry, Chemistry, Louisiana State University, Baton Rouge, LA, 70803, USA, 2Department of Physics and Astronomy, Louisiana State University, Baton Rouge, LA, USA, 3Materials Science and Engineering Laboratory, National Institute of Standards and Technology, Gaithersburg, Maryland 20899, USA, 4Institute for Solid State Physics, University of Tokyo, Kashiwa 277-8581, Japan, E-mail: jcho1@lsu.edu

Single crystals of Ln(CuGa)_{13} (Ln = La-Nd, Eu) compounds have been synthesized by flux-growth methods and characterized by single crystal X-ray diffraction. Ln(CuGa)_{13} (Ln = La-Nd, Eu), which are isostructural to NaZn13, crystallize in the cubic Fm-3c (No. 226) space group, with Z = 8 and lattice parameters \( a = 11.8 \text{ Å} \). Magnetic susceptibility data show paramagnetic behavior down to 2 K for Ce, Pr, Nd, and Eu compound, respectively. Metallic behavior is observed below 300 K for each compound. A large positive magnetoresistance up to 154 % at 9 T is also observed for Pr(CuGa)_{13}. The structure, magnetic, heat capacity and transport properties of these compounds will be presented and compared to Ln(CuGa)_{13} (Ln = Y, Gd-Er, Yb) family of compounds.

Keywords: magnetism, magnetoresistance, flux growth

The local structure & dielectric properties of the cubic pyrochlore Bi_{14-x}M_{x}Mn_{12}O_{27} (M = Mg and Ni)
Binh H Nguyen, Lasse Noren, Ray L Withers, Yun Liu
Australian National University, Research School of Chemistry, RSC, Building 35, Australian National University, Canberra, ACT, 0200,