Metal hydroxides as platform for interfacial functionalities

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Metal hydroxides are an important class of inorganic materials as solid state catalysts, electrodes, precursor for variety of oxides and others. A variety of nano sized metal hydroxides are also reported so far. They are characterized by the accommodation of hydroxyl group as a counter anion for metal cations which brings surface basicity and structural flexibility. The authors have been working on the preparation and application of metal hydroxide nano materials, especially for 1D nano rods, tubes, and belts. The fundamental interest is focused on the control of shape and size of the micro structures in nano to meso scales. Such nano hydroxides possess a large surface area where a large number of hydroxyl group is aligned according to the crystal structures. The surface hydroxyl group can be further used for scaffold to grow different materials. Brief explanation of this concept is depicted in Figure 1. Recent achievements of our group on the preparation and application of 1D metal hydroxides for variety of interfacial applications will be presented. Topic includes:

1. Formation of hierarchically porous hydroxides as adsorbents of toxins in environments
2. Vertically oriented nanotubes for superhydrophobic surface with a switchable adhesion of water
3. Metal hydroxides as a scaffold for metal organic frameworks.

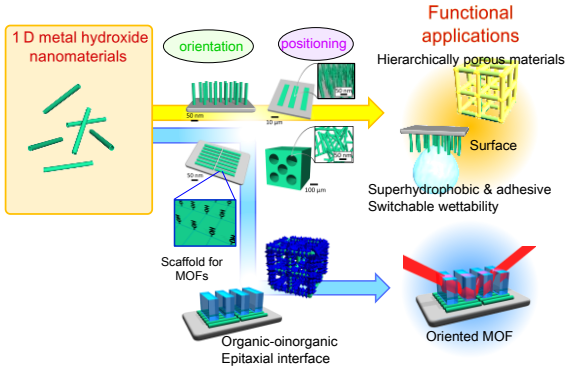

Fig. 1 Metal hydroxide nano materials as a platform for variety of functional applications

Related publications:

1. Okada K., et al.,, *Chem. Mater.*, 119 (5), 37–284 (2015).
2. Tarutani N.,et al., *RSC Advances*, 4, 16075-16080 (2014).
3. Okada K., et al., *Adv. Funct. Mater.*, 24(14), 1969-1977, (2014).
4. Tokudome Y., et al.,*J. Mater. Chem* A (Communications), **2**, 58-61(2013)
5. Tokudome Y., et al., *J. Mater. Chem.* A, 1, 7702-7708 (2013)
6. Okada K., et al., *J. Sol-Gel Sci. Technol.*, 65, 36–40, (2013