Selective transport of liquid- and gas-phase species through nanostructured channels has gained much interest recently due to its promising potential in filtration and separation applications. In this work, we provide discussions on this process through model systems constructed from carbon nanostructures such as graphene, carbon nanotube, as well as their derivatives. Our findings uncover known and unknown molecular mechanisms of the structure-performance correlation, in terms of the trade-off balance between selectivity and permeability. Topics to be presented include (1) performance of osmotic and pressure-driven flow through nanoporous membranes, (2) hierarchy of fluidic transport pathways, and (3) surface-functionalization-mediated selective ion transport in graphene-derived membranes, and (4) the adhesion-diffusion mechanism of selective gas transport in nanostructured networks. These issues will be discussed related to industrial applications such as water desalination, wastewater treatment and gas separation.

References

Short Bio:
Dr. Zhiping Xu received his B.S. (2002) and Ph.D (2007) from Tsinghua University. After working at Rice University (2007-2008) and MIT (2008-2010), he returned to Tsinghua as an associate professor in year 2010. His recent research interests include physics of natural and synthetic network materials and microscale fluid-structure interactions. More information can be found in the group website http://www.cel- tsinghua.org.

Date: 23 July 2015 (Thursday)
Time: 2:00 pm
Venue: Room 4577

~All Are Welcome~