The 43rd iCeMS SEMINAR

Tue 26 Jan 2010
16:00-17:30

Lecturer: **Alexander I. Kolesnikov, Ph.D.**
Senior scientist,
Oak Ridge National Laboratory (ORNL), USA
Visiting Professor of the iCeMS

Neutron Scattering Studies of Water Confined in Nano-channels

Venue: 2nd floor Seminar Room (#A207)
Main Building iCeMS Complex 1, Kyoto University

A new form of water has been discovered by Dr. Kolesnikov. Called nanotube water, these molecules contain two hydrogen atoms and one oxygen atom but do not turn into ice - even at temperatures near absolute zero.
The infiltration of water into carbon nanotubes provides a simple analogue of biologically important trans-membrane channels and so is of large interdisciplinary scientific interest. The structure and dynamics of water/ice confined to the 1-Dimensional nanotube interior are found to be drastically altered with respect to bulk water.

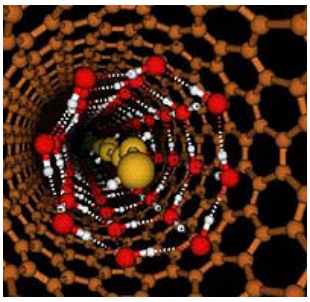
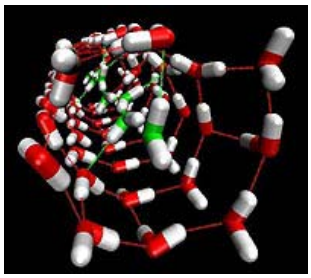


Image by Christian J. Burnham, University of Houston.

NANO-WATER – New form of water in a nanotube. Water behaves differently when confined inside a long, narrow nanotube. The copper-colored exterior rings represent the carbon nanotube 1.4 nano-meters across. The red and white interior cylinder is an icy wall with permanent hydrogen bonds shown in red; white represents oxygen. The interior chain is in constant motion. Yellow represents the hydrogen in the chain.



Courtesy: Alexander I. Kolesnikov

WEAK AND STRONG BONDS – This view of nanotube water shows its strong and weak bonds. The red and white icy exterior wall has permanent bonds shown by the red lines. The interior chain is constantly in motion and its green chains represent temporary, weak bonds.

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Hosted by: Institute for Integrated Cell-Material Sciences (iCeMS), Kyoto University