

# **The Influence of Pressure on Molecular Structure of Water Systems with Functionalized Multi Wall Carbon Nanotubes**

L. Bulavin and I. Adamenko

*Department of Physics, Kyiv Taras Shevchenko University, Kyiv, Ukraine*

A. Okotrub

*Laboratory of Physical Chemistry of Nanomaterials, Nikolaev Institute of Inorganic Chemistry,  
Novosibirsk, Russia*

V. Korolovich<sup>C,S</sup> and K. Moroz

*Department of Physics, Kyiv Taras Shevchenko University, Kyiv, Ukraine*

Water is very important and vital to human activity. Nevertheless, small additions of some substances and external fields: temperature and pressure can essentially influence the structure of water changing its properties. In this work we present the results of the experimental investigation of PVT data and results of the investigation of density by picnometer measurements along the liquid-vapour equilibrium curve of water systems with multi wall carbon nanotubes (MWCNT) having the modified surface. PVT measurements were carried out by using the metallic bellows method with differential inductive sensor of linear shifts over a wide interval of pressures and temperatures. We obtained the isothermal modulus of elasticity, isobaric expansion, isothermal deviation of entropy, enthalpy, total internal energy, and isobaric-isothermal Gibbs potential. These properties of the investigated water systems were analyzed as a function of pressure and temperature and compared with the corresponding properties of pure water. The equation of state for the investigated CNT - water system was obtained. Its parameters were analyzed in detail as a function of temperature.