

EQUATION OF STATE  
NEAR THE CRITICAL POINT  
ON THE BASIS OF THE VAN DER WAALS MODEL  
FOR A WIDE CLASS OF DIELECTRIC LIQUIDS

*A.D. Alekhin<sup>1</sup>, B.Zh. Abdikarimov<sup>2</sup>, L.A. Bulavin<sup>1</sup>,  
Yu.L. Ostapchuk<sup>1</sup>, E.G. Rudnikov<sup>1</sup>, Ye.T. Shimanskaya<sup>1</sup>*

<sup>1</sup>Taras Shevchenko National University of Kyiv,  
Faculty of Physics  
(2, *Prosp. Academician Glushkov, Kyiv 03127, Ukraine;*  
*e-mail: alekhin@univ.kiev.ua*),

<sup>2</sup>Korkyt–Ata Kzyl Orda State University  
(*Kzyl Orda, Kazakhstan Republic*)

S u m m a r y

The fluctuation part of the thermodynamic potential of a system near its critical point considered as a gas of fluctuations that obeys the van der Waals equation has been analyzed in the framework of the fluctuation theory of phase transitions (FTPT). The corresponding extended equation for the coexistence curve for liquid systems in the fluctuation region has been derived and verified, by using the experimental data on the temperature dependences of the liquid and vapor densities for dielectric liquids near their critical points, both for systems homogeneous and inhomogeneous under Earth's gravity.