SUPERMOLECULAR STRUCTURE AND PHASE STATE OF FLUIDS BASED ON THE UNIFIED BOŠKOVIĆ-SAVIĆ-KAŠANIN THEORY

Based on the unified theory of Rudjer Bošković and the theory of Pavle Savić and Radivoj Kašanin, we established that in fluids there are three boundary lines for higher-order phase transitions on the isoḫores $2V_c$, V_c (Widom's line) and $V_c/2$ (Frenkel's line), where V_c is critical volume. Accordingly, there are several phases, each of which consists of two types of molecular and/or supramolecular particles in mutual equilibrium: translating ⇄ 3D rotating individual molecules are in the vapor and gaseous phases; 3D rotating individual molecules ⇄ 3D rotating molecular pairs are in the α gas phase; 3D rotating molecular pairs ⇄ 3D rotating bimolecules in the β liquid phase, and 3D rotating bimolecules ⇄ 1D rotating linear oligomolecules in the γ liquid phase. In each phase, those particles that need less space for rotation prevail in the vicinity of the smaller boundary isoḫora, and those particles that need more space near the larger boundary prevail. All particles have a certain composition and structure, as well as their own quantum-mechanical level. Therefore, the transformation of one particle into another represents a quantum transition. Some evidence for the mentioned phase transitions and structures of supermolecular particles is presented.

Key words: fluid, phase states, supramolecular particles, Widom's line; Frenkel's line; Rudjer Boscovich, Pavle Savich, Radivoj Kashanin