

Congruent phase diagram of fullerenes and alkali metals as a basis for alkali-doped fullerite compounds

Vitaly B. Rogankov, Marina V. Shvets and Oleg V. Rogankov Jr.

Odessa National Academy of Food Technologies, Department of Physics and Materials Science, Ukraine

We have applied the recent methodology of a congruent vapor-liquid (CVL) phase diagram to the study of fullerenes C_{60} , C_{70} and alkali metals: Li, Na, K, Rb, Cs in the wide temperature range from about zero up to the critical points of latter. The striking asymmetry revealed in the restricted range of standard VLE-diagram for fullerenes distinguishes the results of the present work from those obtained by the conventional GEMC-technique. The similar CVL-reconstruction for alkali metals leads to its evident anomaly observable in the entire range of subcritical temperatures including the states of a condensed (metastable liquid and solid) phase. The possible intercalation of alkali atoms existing in the low-temperature metastable vapor into the crystal lattice interstitial sites of fullerites is confirmed by the superposition of two respective CVL-diagrams.

Keywords: congruent, fullerites, phase diagram.

Biography:

Vitaly B. Rogankov is a Dr. of Phys.-Math. Sci., Prof. of Department of Physics and Materials Science of Odessa National Academy of Food Technologies. The scientific interests are ranged from the theory of phase transitions and criticality in mixtures up to the study of complex heterophase states in the finite-size systems, ionic liquids, nanotechnology of fullerene problem in a fluid state (computational phase diagram, equation of state etc.). Author of about 100 papers in reputed journals and three monographs on the above items.