

THERMODYNAMIC BASES OF PALLADIUM CATALYST PRODUCTION WITH THE USE OF SUPERCRITICAL CARBON DIOXIDE.

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Abstract

For the purpose of investigation of the applicability of supercritical carbon dioxide for catalyst production, a synthesis of palladium chloride and its derivatives: benzonitrile $PdCl_2(C_6H_5CN)_2$, styrene $C_8H_8PdCl_2$, and cyclohexene $C_6H_{10}PdCl_2$ complexes was performed, and the dynamic solubility of these substances were measured. As an apparatus for the measurement of solubility, supercritical fluid chromatograph was used. A scheme of the apparatus is shown in the figure 1.

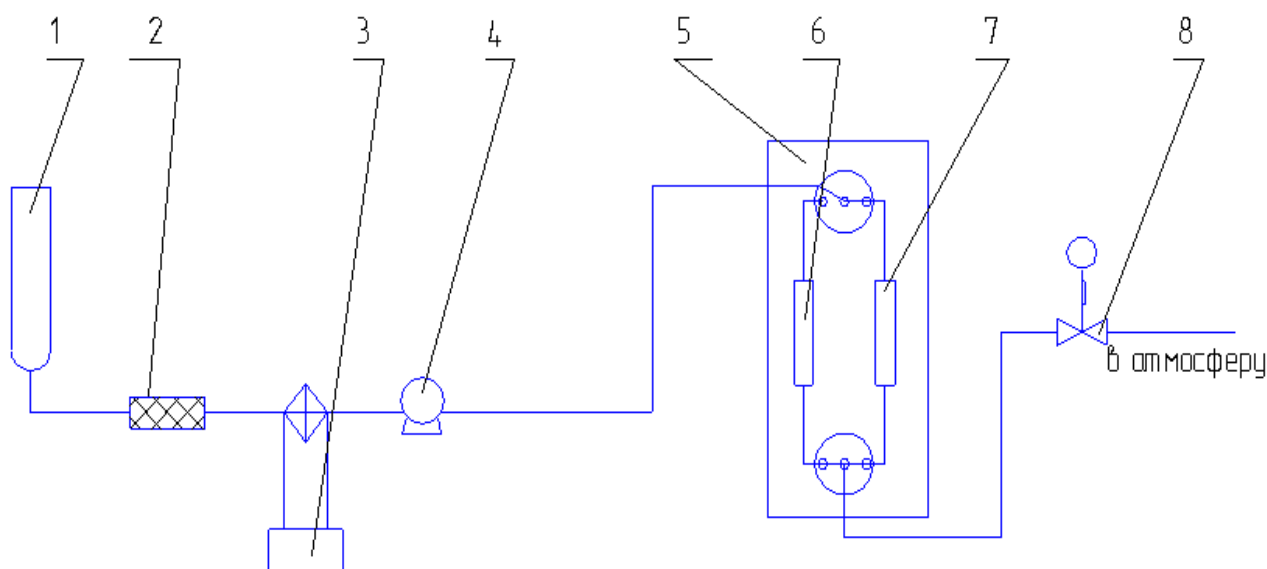


Figure 1. An apparatus for solubility measurement

1-CO₂ supply, 2-filter drain, 3-cooler, 4-pump, 5-thermostat, 6,7- vessels, 8-pressure regulator

Detailed technique of the experiment is given in the report [1].

At the first step of the experiment the solubility of palladium chloride in supercritical carbon dioxide was investigated. It was defined that palladium chloride is insoluble in the fluid.

After that the solubility of organic derivatives of palladium chloride were studied at various temperatures (308.15K, 318.15K и 328.15 K) and pressures (10 - 32.5 MPa). The results of these experiments are shown in the diagrams 2-4.

Last step was impregnation of $\gamma\text{-Al}_2\text{O}_3$ with benzonitrile complex $\text{PdCl}_2(\text{C}_6\text{H}_5\text{CN})_2$.

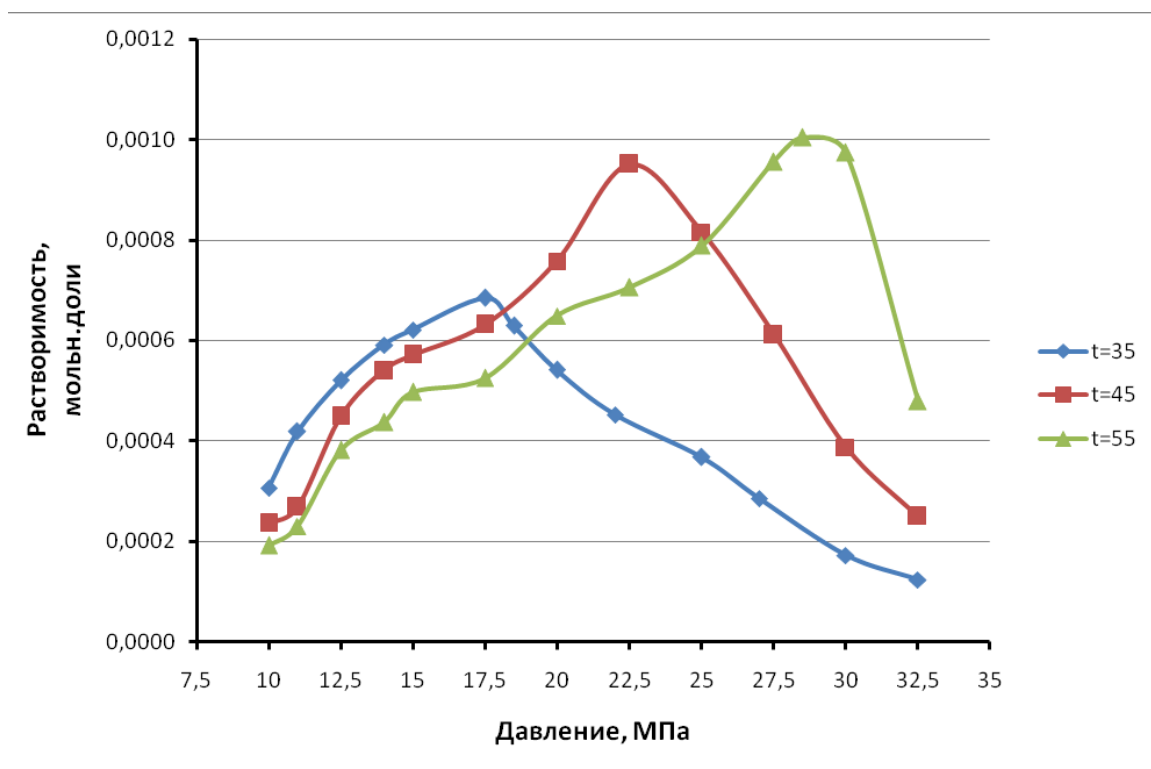


Figure 2. The solubility of benzonitrile complex of palladium chloride in supercritical carbon dioxide

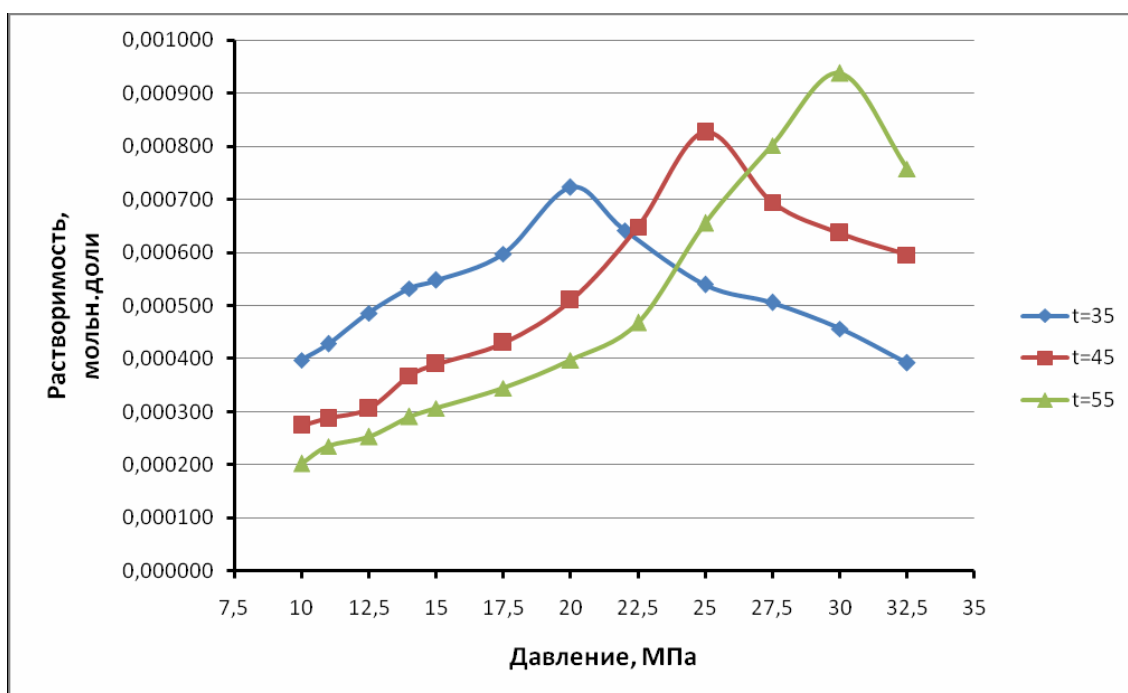


Figure 3. The solubility of styrene complex of palladium chloride in supercritical carbon dioxide

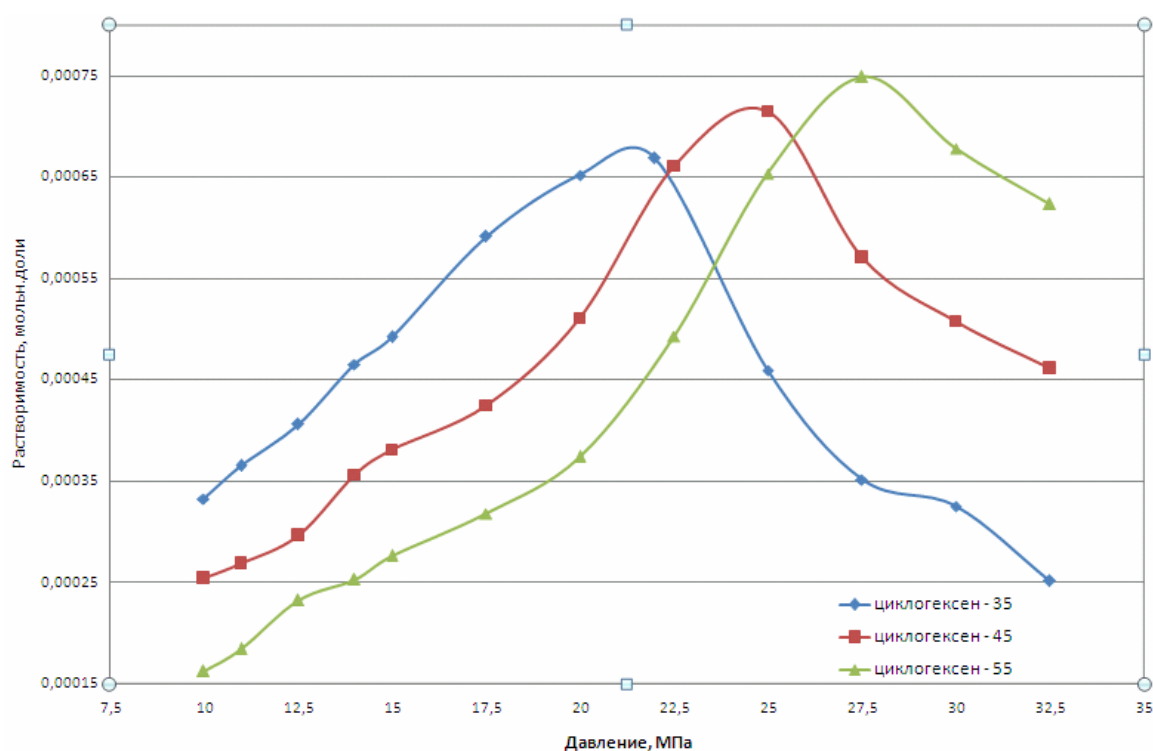


Figure 4. The solubility of cyclohexene complex of palladium chloride in supercritical carbon dioxide

Literature.

[1]. Measurement of solubility of substances in supercritical carbon dioxide with the use of supercritical fluid chromatograph. T.R. Bilalov, I.R. Sharafutdinov, F.R. Gabitov, F.M. Gumerov. IVth international scientific conference "Supercritical fluids: fundamental bases technologies, innovations"