A portion of catalyst (0.03 g) was introduced into the reaction vessel with 1.2 ml of acetonitrile. Next, cyclohexane (0.3 ml) and hydrogen peroxide were introduced in the form of 30% aqueous solution, taken in threefold excess with respect to substrate. The reaction mixture was stirred with magnetic stirrer. Oxidation was carried out at 313 K and atmospheric pressure. Reaction mixture was analyzed chromatography after certain periods of time. The amount of released oxygen was determined by volumetric method.

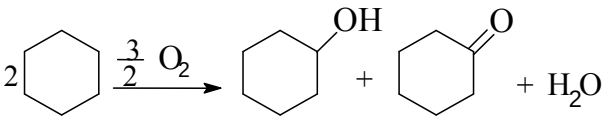
Cyclohexane and products of its oxidation were analyzed by LHM-80M chromatograph with flame ionization detector in isothermal mode. Stainless steel column with length of 3 m and internal diameter of 3 mm was filled with N/W-DMCS chromaton with active phases of 15% Apiezon-L and 3% Carbowax-20M.

Results and discussion

Synthesized catalysts were studied in reaction of cyclohexane oxidation with hydrogen peroxide. Cyclohexane oxidation is carried out according to the scheme below. Oxygen, which is formed during decomposition of H_2O_2, is emitted as a gas, and a part of it is consumed for oxidation of cyclohexane:

$$H_2O_2 \rightarrow H_2O + \frac{1}{2}O_2 \xrightarrow{Cyclohexane} Oxidation\ \ products$$

Formation of oxygen-containing compounds – cyclohexanol (-ol) and cyclohexanone (-one) takes place according to reaction:



Calculated amount of oxygen required for oxidation of 1 mole of cyclohexane is 0.75 mole.

The results of cyclohexane oxidation on synthesized systems are presented in Table 1.

Table 1 - Yield of cyclohexane oxidation* with H_2O_2 products on catalysts 5% $K_4[Fe(CN)_6]$ -PVP/support

Catalysts	Reaction products, %		Conversion, %	Selectivity,%	
	-ol	-one		-ol	-one
5% K_4 $[Fe(CN)_6]$-PVP/Siral-40	35,8	7,1	42,9	83,4	16,6
5% K_4 $[Fe(CN)_6]$- PVP /Siral-20	30,9	19,2	50,1	61,7	38,3
5% K_4 $[Fe(CN)_6]$- PVP /γ-Al_2O_3	13,7	11,8	25,5	54,9	45,1
5% K_4 $[Fe(CN)_6]$- PVP /SiO_2	12,1	5,1	17,2	70,4	29,6

* Reaction conditions: solvent – acetonitrile, T = 313K, P = 1 atm.

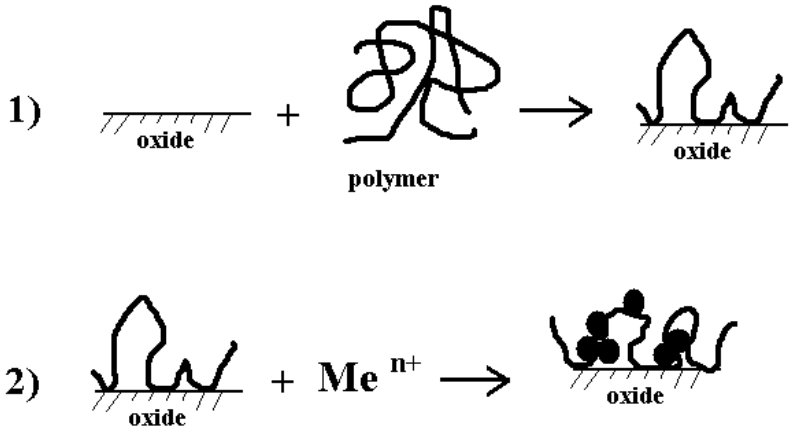


Figure 2 - Scheme of supported polymer-metal complex formation