The yield of liquid fraction when processing within 15 min. at T=450°C on catalyst WFP: zeolite of composition 40: 60 was higher and corresponded on plastic – 67.01 wt. %, and on mixture rubber: plastic – 65.97 wt. % (Table 2).

## EXPERIMENTAL

The experiment was made on installation of periodic action under pressure from 5 to 7 MPa and temperatures of 400-450°C in a continuous mixing regime. The installation is represented by a stainless steel metal reactor Kh18N10T of the "duck" type with a volume of 0.25 $dm^3$. Thermal heating was realized by means of the heater of the alternating current regulated by the transformer and the ampermeter. Temperature monitoring in the reactor was carried out using a thermocouple with a chromel-copel, the readings were recorded on a KSP-4 instrument whose scale was calibrated for boiling temperatures of water (100°C), melting of tin (232°C), lead (327°C) and zinc (427°C). The pressure in the hydrogenation process was created by argon, the change of which was fixed with a manometer. A mixture of crushed polymeric materials, catalyst and paste former (PF) - black oil with a boiling point> 350°C, heated to 70-80°C, was loaded into the reactor, then the reactor was checked for leaks, purged with argon, a pressure of 0.4-0.5 MPa, then the heating device was turned on. During the hydrogenation process, a pressure change was recorded using a manometer due to temperature increase, gas separation and the presence of volatile components. After the experiment, the heating of the reactor was switched off and the system was cooled to room temperature. The gas formed in the process was collected in a gas meter with a saturated salt solution. The amount of gas formed was determined from the pressure difference.

Ultrasonic treatment of polymeric wastes was carried out on multifunctional laboratory ultrasonic complex MARK-3/22-AL. Cryoprocessing of the rubber and plastic samples under study was carried out with liquid nitrogen in a Dewar vessel. X-ray phase analysis of the catalysts was carried out on an X-ray diffractometer ARL X'TRA. The specific surface area of the samples of catalysts based on activated zeolite and WFP was determined by the method of nitrogen porosimetry on the AUTOSORB-6B unit.

## CONCLUSION

The carried-out complex of analyses of composition and physical and chemical properties of catalysts has allowed to draw a conclusion that the studied samples on the basis of polymetallic waste of ferroalloys and the activated natural zeolite on the elemental composition and superficial structure are of interest as available, rather cheap and active catalysts to process of hydrogenation thermocatalytic processing of carbon-containing waste on the basis of worn tires and plastic in motor fuels. In this work it was shown the possibility of implementation of an integrated approach to preparation of waste of rubbers and plastic by preliminary processing by ultrasound, radiation exposure, cryogenic processing by liquid nitrogen with the subsequent mechanical grinding which lead to increase in degree of dispersion of raw materials, separation of organic mass from the accompanying components and simplification of its transformation into liquid fuel products. It was found that the most optimal for the liquid product yield are rubbish and plastic waste, treated with ultrasound at $I$ = 5 W/$cm^2$; $T$ = 150 sec. - 61.0 wt.%, and the yield of gases depends little on the intensity and time of cavitation treatment; irradiation of waste rubber and plastics (D=100-500 kGy) reduced the yield of liquid fractions by 8-10 wt.% and increases gas formation by 4-5 wt.%. It was shown that with increasing degree of dispersion of rubber by treatment with liquid nitrogen and mechanical grinding, the activity of the investigated catalyst increases; the yield of the liquid product changes by about 3% by wt. and is in the range of values 54.13-56.06% by wt. The composition and texture properties of the composite catalyst have been established.

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