

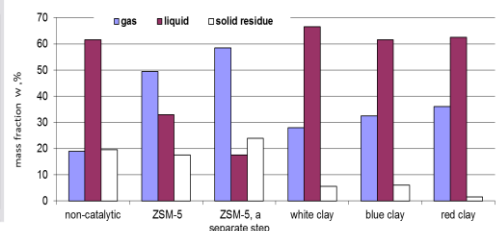
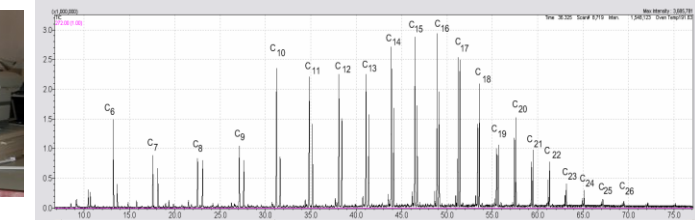
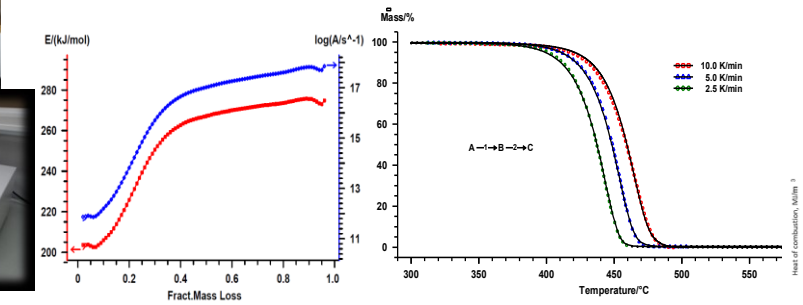
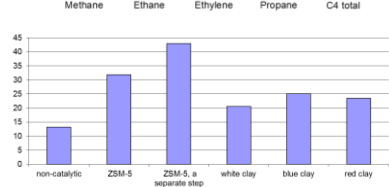
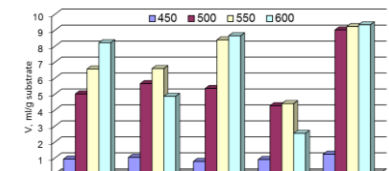
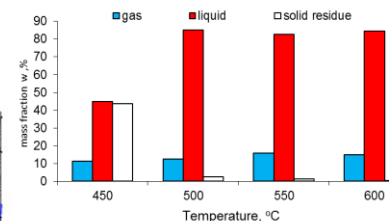
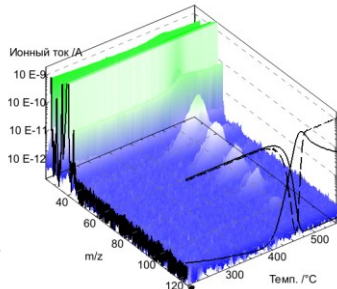
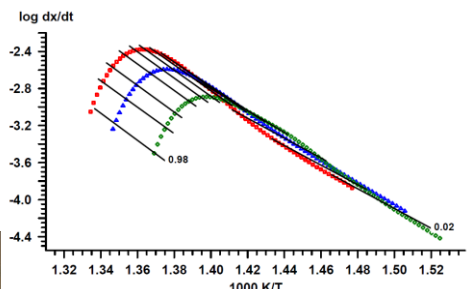


STUDY OF THE PROCESS OF THERMAL DEGRADATION OF WASTE CROSS-LINKED POLYETHYLENE

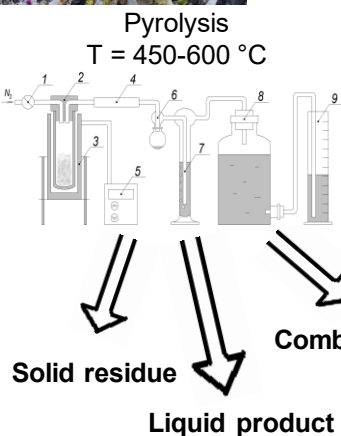
Chalov K.V., Lugovoi Yu.V., Kosivtsov Yu.Yu., Manaenkov O.V., Sulman E.M.

Tver State Technical Univ., Dept. Of Biotechnology and chemistry, A.Nikitin str., 22, 170026 Tver, sulman@online.tver.ru

The need to dispose of environmentally resistant waste plastics is primarily associated with their negative impact on the environment. Crosslinked polyethylene is used in the production of insulation of cables, sanitary pipes and fittings for hot water supply. The problem of cross-linked polyethylene waste recycling is becoming more and more urgent every year, because the complexity of cross-linked polyethylene processing is the presence of a mesh structure that does not allow waste recycling by extrusion. Therefore, the majority of cross-linked polyethylene waste is burned as fuel or subjected to burial.



Parameter		Meaning
activation energy E_a , kJ/mol	step 1	175
	step 2	308
pre-exponential factor lgA , c^{-1}	step 1	10,23
	step 2	19,99
reaction order n	step 1	0,67
	step 2	0,80
logarithm of the autocatalysis constant lgK_{cat}	step 1	0,22
weight loss, %	step 1	0,20
	step 2	0,80



Conclusions

The process of destruction of cross-linked ethylene occurs most intensively in the temperature range 433.3-465.3 °C. The optimum temperature of the pyrolysis process is 500 °C, which allows to obtain the highest yields of liquid products and to achieve the maximum calorific value of the resulting pyrolysis gas. The process of thermal destruction most likely proceeds in two consecutive poorly separable stages with activation energies of 224 and 310 kJ/mol.