

8.1 Rational Technology for Processing the Oil Shale from Different Deposits in the World

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The possibilities of using technology for processing oil shale by means of its pyrolysis, which was developed and realized by staff of our institute and was awarded in 2008 by International Premium "Global Energy", are considered in the case of its application for the oil shale of different countries (Russia, Jordan, Israel and Morocco). Two commercial plants operating in Estonia allow obtaining high end products: shale oil with very low ash content (less than 1%), from which it is possible to obtain gasoline fractions, diesel fuel and fuel oil, and high-energy gas with the net calorific value $G^w_1 = 42.2$ MJ/kg. These plants have processed since 1992 more than 12 million tons of oil shale and produced about 1.5 million tons of shale oil and 450 million m^3 of high BTU gas. The characteristics of oil shale and products obtained after its processing - shale petrol, diesel fraction, fuel oil, semicoke pyrolysis gas - are presented. The following advantages of the technology are marked: its high thermal and economic efficiency (more than for all technologies existing in the world), the high ecological characteristics and the possibility of using pyrolysis products for generation of electric energy by means of the most efficient combined cycle. The schematic diagrams for obtaining electricity by this combined cycle and their thermal efficiency are presented. The possibility of obtaining thiophene and its homologs from the shale oil fractions with high component of sulfur-organic compounds as well as other vendable products, which can be successfully used, is shown. Nomograms for the quantitative determination of the possibility of our technology application for the different oil shale existing in the world are given taking into account the results of testing the oil shale from 35 deposits of different countries. The conclusion on possibilities of using this technology for the different deposits of oil shale with the net calorific value more than 3.77 MJ/kg is made that will be a serious contribution in solving the world problem of natural oil reserves depletion.