RADIATION-CHEMICAL TRANSFORMATIONS OF LIGNITES OF KARAMAN -ERMENEK DEPOSITS OF TURKEY AT THE ACCELERATED ELECTRONS IMPACT

F.CICEK, K.YAGUBOV, I.MUSTAFAEV
Institute of Radiation Problems, Azerbaijan National Academy of Sciences. 31-a H.Javid ave, AZ1143 Baku, Azerbaijan. imustafayev@mail.ru

The study of radiation-chemical transformation of coal has a great importance for establishment of the role of radiation in genesis and metamorphism of fossil fuels and definitions of radiation stability of carbonaceous materials, used in the Nuclear technology. In this work the regularities of transformation of lignites from Karaman-Ermenek deposits of Turkey are studied. The basic characteristics of the investigated samples are: ashes-19.26 %, a moisture-15.6 %, sulphur-2.01 %, Calorific value - 3775 kcal/kg. Processes were spent at the impact of accelerated electrons the linear accelerator (ELU-6) at W= 12 W. Thus rate of the absorbed dose made 4680 kGy/h. The absorbed dose in lignites changed within the limits of 1170-3120 kGy. As a basic parameters of process rate of gas formation , losses of initial mass of lignite, the contents of sulfur in the solid rest have been defined. The gases of H2, CO and CH4 are identified. Radiation-chemical yield of these gases on initial site of kinetic curves make: G (H2) =0.172 molec/100 eV, G (CO) =0.25

molec/100 eV and G (CH4) =0.047 molec/100 eV. During the irradiation about 11.5 % of mass of the sample it is allocated in the form of volatile products. The contents of sulfur in the solid rest also decreases from 2.01 % up to 1.62 %. Last circumstance is connected with selective clearing sulfur of organic mass of lignites, that is connected with highest electronic density of atoms of sulfur than atoms of carbon and hydrogen.

Earlier we have established /1/, that at the gamma-radiolysis of lignites of Karaman-Ermenek at the dose rate 2.7 kGy/h radiation-chemical yields of gases are: G (H2) =0.022 molec/100eV, G (CO) =0.004 molec/100 eV and G (CH4) =0.0017 molec/100 eV. Supervision of significant excess of radiation-chemical yields of gases in case of use accelerated electrons is connected, apparently, with local heating of coal mass at braking of electrons. It also leads to disintegration of flying components with rather loss of the sample mass.

In the report specific features of radiation-chemical disintegration of organic mass of lignite under accelerated electrons impact are discussed. Technical and economic data about radiation processing of organic solid fuels are adduced.

Reference

1.. Mustafaev, F.Cicek. Gas Formation at the radiation-chemical decomposition of Turkish lignites. XXIII International Mineral Processing Congress.3-8 September 2006, Proceedings V. 3, p.2554-2558, Promedadvertsing-2006.