

OXIDATION PROCESSES IN ASPHALTENES

R.A.JAFAROVA¹, CH.G.SALMANOVA¹, U.J.YOLCHUYEVA^{1,2,4}, A.M.MAMMADOV^{1,2}, G.A.HAJIYEVA¹,
F.T.ALIZADEH^{1,3,4}, E.I.AZIZBAYLI¹, A.F.ALIYEVA¹

1. *Institute of Petrochemical Processes of Ministry of Science and Education Republic of Azerbaijan, Khojali ave. 30, AZ1025, Baku, Azerbaijan*
2. *Department of Chemical Engineering, School of Engineering and Applied Science, Khazar University, 41 Mahsati Str., AZ 1096 Baku, Azerbaijan*
3. *Geotechnological Problems of Oil, Gas And Chemical Science-Research Institute of ASOIU, Dilara Aliyeva st. 227, AZ 1010, Baku, Azerbaijan*
4. *Baku State University, Zahid Khalilov 23, AZ 1148, Baku, Azerbaijan*

Keywords: asphaltene, free radical, paraffin

It is known that electron paramagnetic resonance (EPR) is generated mainly by free carbon bonds in the condensed aromatic structure of asphaltenes. With an increase in temperature (above 380°C), the effect of ultraviolet rays and the mechanical processing procedure, the number of free radicals in the substance increases, that is, the oxidation process accelerates. The scheme of the formation of free radicals from resins and asphaltenes under the influence of light energy is as following: when the formed free radicals interact with molecular oxygen, peroxide radicals, hydroperoxides and then high-molecular complex compounds are formed [1].

Paraffin series hydrocarbons reduce the number of free radicals. As the molecular weight of the oxidized bitumen increases and its oxidation deepens, the intensity of the EPR signal increases, which is explained by the increase in the amount of asphaltenes and the number of free radicals. It should be noted that the number of free radicals in cracked bitumen is higher than the number of free radicals in oxidized bitumen of that brand. If we take the number (amount) of free radicals in the oxidized bitumen of the "БН-II" brand to be 100, in "БН-III" and "БН-IV" its number is 170 and 180, respectively, and in cracked bitumen of the corresponding brands, it is 175 and 200 [2].

REFERENCES

1. Аббасова Д.Р., Джафарова Р.А., Керимов М.К. Характеристики спектров ЭПР смол, выделенных из нефтей различных месторождений // Журнал Известия высших учебных заведений, нефть и газ, Беларусь, 2010, с. 85-88.
2. Christian George, Markus Ammann, Barbara D'Anna, D.J.Donaldson, and Sergey A. Nizkorodov. Heterogeneous Photochemistry in the Atmosphere // Chemical Reviews, 2015, № 10, p.4218-4258.