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RESEARCH

ELECTROPHYSICAL PROPERTIES OF LIQUID HYDROCARBON MEDIA

I. N. Evdokimov and N. Yu. Eliseev

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The electrophysical properties of crude oils and liquid petroleum products play an important role in the study of their disperse structure, primarily determined by the content of high-molecular-weight resin-asphaltene components (RAC). The great interest in these properties is also related to the industrial use of electric fields for both intensifying technological processes (dehydration, desalting, dewaxing) and for quality control of crude oils and petroleum products.

The experimental temperature curves of the dielectric constant of petroleum disperse systems have been successfully used for studying the characteristics of macroscopic structural phase transitions (SPT), in particular, the transition for a cohesively disperse (gel) to a freely disperse state (sol). This allowed developing new methods of determining the solid point of crude oils [1].

Until now, however, insufficient attention has been focused on the study of macroscopic SPT in the freely disperse state of petroleum systems on the level of the individual disperse particles and aggregates of molecules of RAC. The promise of using electrophysical methods for investigating SPT on the microscopic level was demonstrated in [2] for polymers.

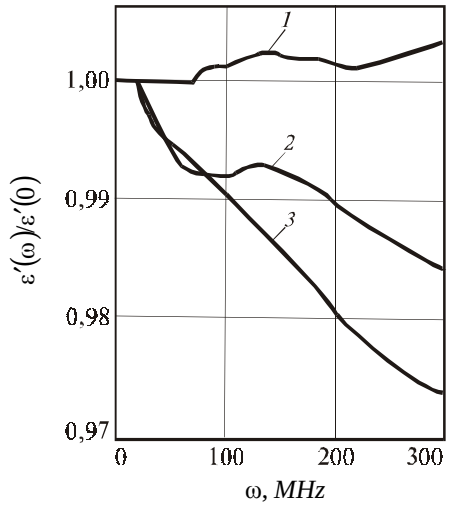

Fig. 1. Normalized curves of the real part of the dielectric constant ε′ vs. electric field frequency ω at 22°C for liquid media: 1) toluene; 2) vacuum resid; 3) mixture of toluene with 282 g/liter of vacuum resid.

I. M. Gubkin Russian State University of Oil and Gas. Translated from *Khimiya i Tekhnologiya Topliv i Masel*, No. 1, pp. 29 – 31, January – February, 2001.

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