Investigation Of Impact Of The Electric Discharges On Organosilicon Varnish Film Applied On The Textolyte Surface

Vsevolod V. Andreev
Chuvash State University, Moskovskiy pr. 15, Cheboksary 428015, Russia

In this investigation in the cell of dielectric barrier discharge to impact of electrical discharges the textolyte plate of 0.5 mm thick and of 10x15 cm size on the surface of which was applied a heat-resistant organosilicon varnish film was exposed. On the metal electrodes of 1.5 mm diameter, which in cell of dielectric barrier discharge are located perpendicularly to the textolyte surface, the electrical voltage with effective value of 7 kV and with frequency of 50 Hz was applied. The impact of electric discharges lasted until the time when dielectric breakdown did not occurred.

The experiments aim was connected with the necessity of development of new dielectric materials that to the devastating impact of the electric field, microdischarges and the ozone can withstand in the discharge cell of dielectric barrier discharge. In these studies the microstructure and morphology of the film which applied on the textolyte surface were investigated in the neighborhood of its electric breakdown point.

Target-oriented approach was utilized for the optimization of the analytic measurements [1]. Before measurements the samples were mounted on a 25 mm aluminum specimen stub and fixed by conductive silver paint. Metal coating with a thin film (13 nm) of carbon was performed using magnetron sputtering method as described earlier [2]. The observations were carried out using Hitachi SU8000 field-emission scanning electron microscope (FE-SEM). Images were acquired in secondary electron mode at 30 kV accelerating voltage and at working distance 8-15 mm. Morphology of the samples was studied taking into account possible influence of metal coating on the surface [2].

EDX-SEM studies and mapping were carried out using Oxford Instruments X-max EDX system. Before the measurements samples were coated with a thin film (13 nm) of carbon using Cressington 208 carbon coater.

[1] V.V. Kachala, et. al., *Russ. Chem. Rev.* **82**, 648- 685 (2013)
[2] A.S. Kashin, et. al., *Russ. Chem. Bull. Int. Ed.* **60**, 2602- 2607 (2011)

Acknowledgment

Electron microscopy characterization was performed in the Department of Structural Studies of Zelinsky Institute of Organic Chemistry, Moscow, Russia.