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Modeling of swelling of epoxy-rubber adhesive layer in organic solvents

© **Ludmila A. Brusnitsina**,[1,2]* **Tatiana A. Alekseeva**,[1,2+] and **Elena I. Stepanovskih**[1]
[1] *Physical Chemistry and Chemistry of Colloids Academic Department.*
Ural Federal University Named after the First President of Russia B.N. Yeltsin.
Mira St., 19. Yekaterinburg, 620002. Russia. E-mail: tat-alekseeva@mail.ru
[2] *Ural Institute of the State Fire Service of the Ministry of Emergency Measures of Russia.*
Mira St., 22. Yekaterinburg, 620062. Russia.

*Supervising author; +Corresponding author
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Abstract

The swelling kinetics of epoxy-rubber adhesive layer was investigated in dimethylformamide and dimethylsulfoxide by changing the mass of the sample in time. It was found that the rate of swelling in dimethylformamide two times higher than in dimethylsulfoxide.

Three models of swelling of epoxy-rubber adhesive layer were proposed. It was shown that to describe the process of swelling can not be used the classical model and the model of «inhibition». The swelling should be regarded as the diffusion of solvent molecules into the adhesive layer.

The mathematical description of the process was shown. The rate constants of swelling in dimethyformamide and dimethysulfoxide were calculated.