

DSCM 55P COLOR STABLE FUNCTIONAL SOL-GEL FILMS ON FUSIBLE SUBSTRATE

Kovalenko D.L*, Gaishun V.E., Vaskevich V.V., Semchenko A.V.

Francisk Skorina Gomel State University, Gomel, Belarus

*E-mail: dkov@gsu.by

Currently, there are advanced materials that can demonstrate extraordinary hardness, being a very flexible and elastic. Coatings of these very thin materials are characterized by transparency, high resistance to various mechanical stresses, excellent resistance to aggressive medium, so the scope of the application of such materials is truly wide. One practical application areas of modern silica-based coatings - is getting resistant decorative and durable coatings on the surface of glass and polycarbonate plastic products to protect them.

For the synthesis of such coatings, we propose to use the sol-gel method, which allows obtaining the functional coating based on different components of organic silica. It does not require expensive complex equipment. Using this method allows to obtain coatings with different properties by varying the composition of the initial film-forming solution and the temperature changing treatment regimens.

Solutions based on organometallic compounds of silicon were prepared to produce the silica-based coating (methyltriethoxysilane and tetraethylorthosilicate) in a water-alcohol solution. Ready solutions storage at room temperature two days. For decorative coatings in the solutions of film-forming organic dyes injected (rhodamine 6G, coumarin 7, methylene blue). For color stable to UV irradiation was added ions of cerium. Sol deposit to the substrate by various methods such as dip, spin and spray methods. After that all of the samples were heat treatment at 90-110 °C, 120 minutes.

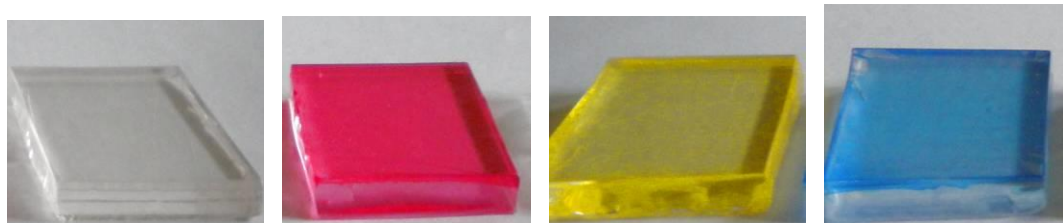


Fig. 1 – Functional color coatings on polycarbonate

The mechanical strength of the obtained was characterized by resistance to abrasion and hardness was determined by a pencil scratching. The test results obtained show that the coatings for abrasion resistance is more than 5000 cycles, and by pencil test corresponds to 5H. Hardness test method shows that coatings corresponds to standard ISO 15184:2012.

To study the adhesion to plastic was used parallel cuts method (ISO 2409: 2013). The study results show that the developed coating has class 0 adhesion to the surface.

[1] Protective sol-gel coating with hydrophobic properties / V.V. Vaskevich, V.E. Gaishun, D.L. Kovalenko, V.V. Sidsky // *Problems of physics, mathematics and technics*. **volume №3(8)**, (2011), P 15-19.

[2] Investigations on B-doped SiO₂ thermal protective coatings by hybrid sol-gel method / X. Zhao [et al.] // *Thin Solid Films*. **volume №15**, (2011), P 4849-4854.