

copolymer being 15-20 %, while MMA monomer used for the copolymer dissolution in the resin had mass fraction close to 0.5.

Our work is aimed at a production of resins close in composition to industrial analogues. Radical copolymerization of MMA with BA in the presence of benzoyl peroxide has been carried out by a compensating copolymerization method involving one of the monomers dosed feeding during the reaction [3]. Synthesis conditions are determined giving an opportunity to produce a resin similar to DEGAROUTE®661. Based on the resin synthesized a composition is obtained capable to cure at an ordinary temperature for 15-20 minutes, to be used as a basis for road marking material.

### References

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## Properties of layer-by-layer coatings based on poly(allylamine)-graft-poly(ethylene glycol) copolymers and dextran sulfate

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Polymers grafted with poly(ethylene glycol) (PEG) are in demand in many biomedical applications as perspective materials to form coating possessing high resistance to protein adsorption[1]. Grafted copolymers of poly(allylamine hydrochloride) (PAH,  $M_w$  70 kDa) and PEG,  $M_w$  5 kDa (PAH-PEG) were synthesized using EDC/sulfo-NHS crosslinkers [2]. The end-group of PEG was preliminary carboxylated with potassium permanganate. The degree of grafting was controlled by varying the mass ratio of PEG to PAH and determined spectrophotometrically [3]. Copolymers were purified by dialysis (MWCO 10 kDa) and freeze-dried. Their structure was confirmed by FTIR spectroscopy.

Multilayer coatings (PAH-PEG/DexS)<sub>3,5</sub> were formed via layer-by-layer (LbL) assembly of the copolymers and dextran sulfate (DexS, 500 kDa) at ambient temperature from diluted solutions (1 mg/mL, pH 5.5±0.2). A quartz crystal microbalance (QCM 200 SRS, 5 MHz) equipped with a flow cell was used for monitoring the formation of multilayers (Table). Fetal bovine serum (FBS) was adsorbed on the LbL film surface for 1 h and then removed by passing water through the cell. The mass adsorbed on a resonator was calculated

according to the Sauerbray equation, the density of coatings was assumed to be equal  $1.3 \text{ g/cm}^3$  [4].

Table. Properties of PAH-PEG/DexCoatings

PAH-PEG	m(PEG)/m(PAH), mg/mg	Grafting degree (g)	Bilayer thickness*, nm	Mass of adsorbed FBS proteins**, $\mu\text{g/cm}^2$
PAH	–	–	0.7	1.6
1	0.2	58	1.0	1.0
2	2.7	18	1.1	0.7
3	5.5	9.6	0.9	0.6
4	11.0	5.3	0.9	0.2

\*  $\pm 15 \%$ ; \*\*  $\pm 0.2 \mu\text{g/cm}^2$

Thus, replacing PAH in a (PAH/DexS)<sub>3,5</sub> coating by PEG-grafted copolymer allowed us to reduce FBS proteins adsorption on the films surface by 38–88 %.

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## Aggregation of kanamycin A. Quantum chemical calculations

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Kanamycin is an aminoglycoside antibiotic. The study of the structure of kanamycin provides valuable information for the investigation of other antibiotics, which can facilitate an understanding of their biological activity, and is also useful for molecular modeling calculations. The absolute configuration of kanamycin A was determined by X-ray diffraction study of kanamycin monosulfate [1]. Kanamycin can form stable dimers and higher aggregates in solutions. However, in literature there are a few data on the aggregation of kanamycin. Theoretical determination of the structure of kanamycin dimer is a difficult task, because kanamycin is a flexible molecule and a lot of conformations should be considered.

In this work, the structure of kanamycin A dimer has been investigated. The semi-empirical GFN-xTB method has been used for the conformational search to obtain the initial structures for global minimum searching. The resulting