

Synthesis and post-polymerization modification of thermo-responsive coatings based on pentaerythritol monomethacrylate: surface analysis, wettability and protein adsorption

Yurij Stetsyshyn^{1}, Joanna Raczkowska^{2*}, Andrzej Budkowski², Andrij Kostruba³,
Volodymyr Donchak¹, Khrystyna Harhay¹, Halyna Ohar¹, Kamil Awsiuk², Andrzej
Bernasik^{4,5}, Nazar Ripak¹, Joanna Zemła²*

¹“Lvivska Polytechnika” National University, S. Bandery 12, 79013 Lviv, Ukraine

²Smoluchowski Institute of Physics, Jagiellonian University, Łojasiewicza 11, 30-348
Kraków, Poland

³Lviv Academy of Commerce, Samtshuk 9, and Lviv Institute for Physical Optics,
Dragomanov 19, 79011 Lviv, Ukraine

⁴Faculty of Physics and Applied Computer Science and ⁵Academic Centre for Materials and
Nanotechnology, AGH University of Science and Technology, Mickiewicza 30, 30-059
Kraków, Poland

*Corresponding author E-mail: Yurij Stetsyshyn yrstecushun@ukr.net, Joanna Raczkowska joanna.raczkowska@uj.edu.pl

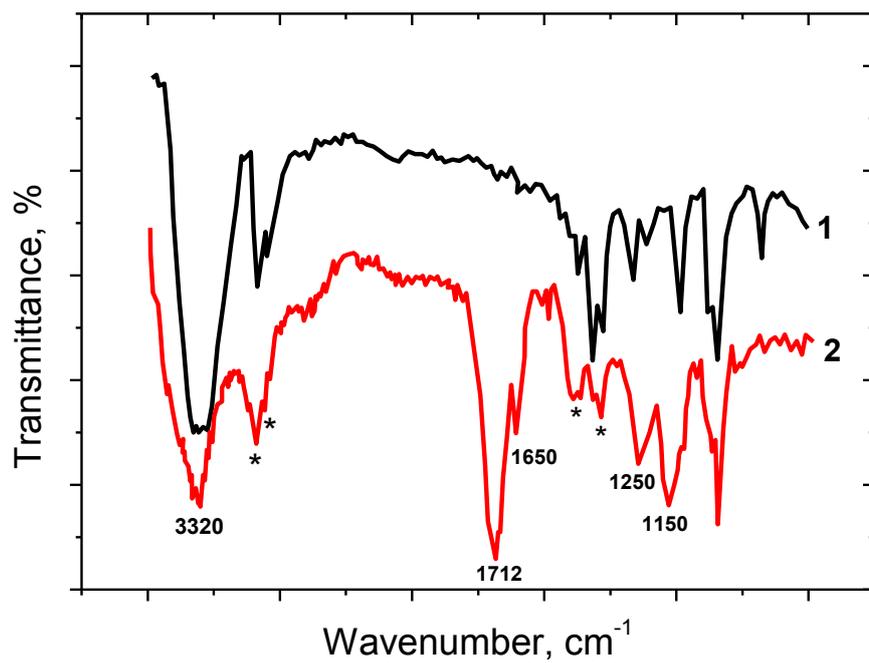


Fig. S1. IR spectra of pentaerythritol (1) and pentaerythritol monomethacrylate (2).

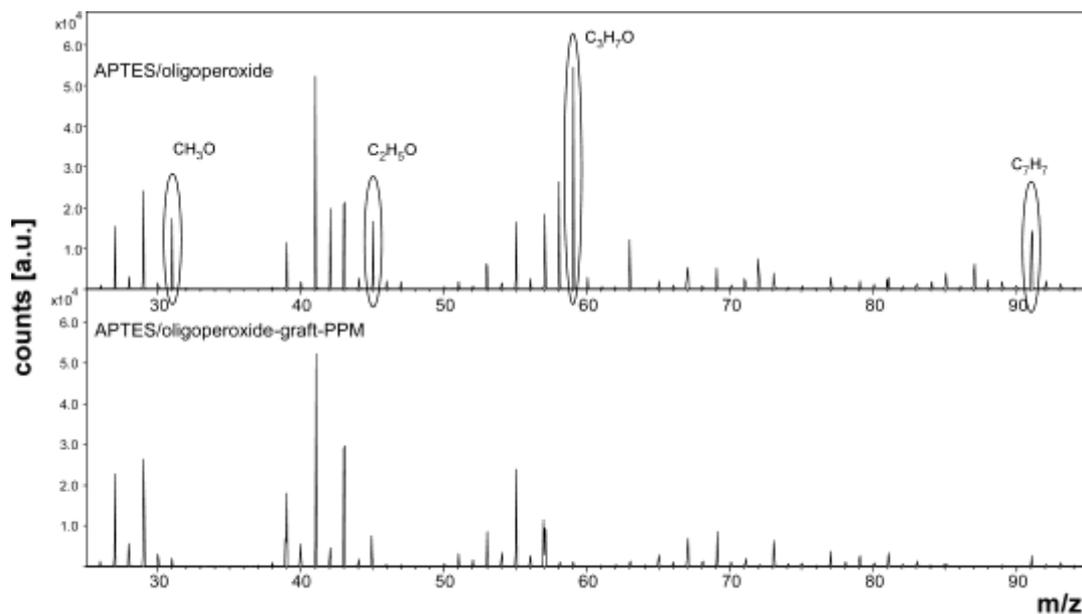


Fig. S2. Representative positive ion TOF-SIMS spectra of APTES-modified glass surface after subsequent steps of oligoperoxide grafting for 24 h (a) and PPM polymerization for 48 h (b). The signals characteristic for the coating following each fabrication step are marked with secondary ion names and ellipses.

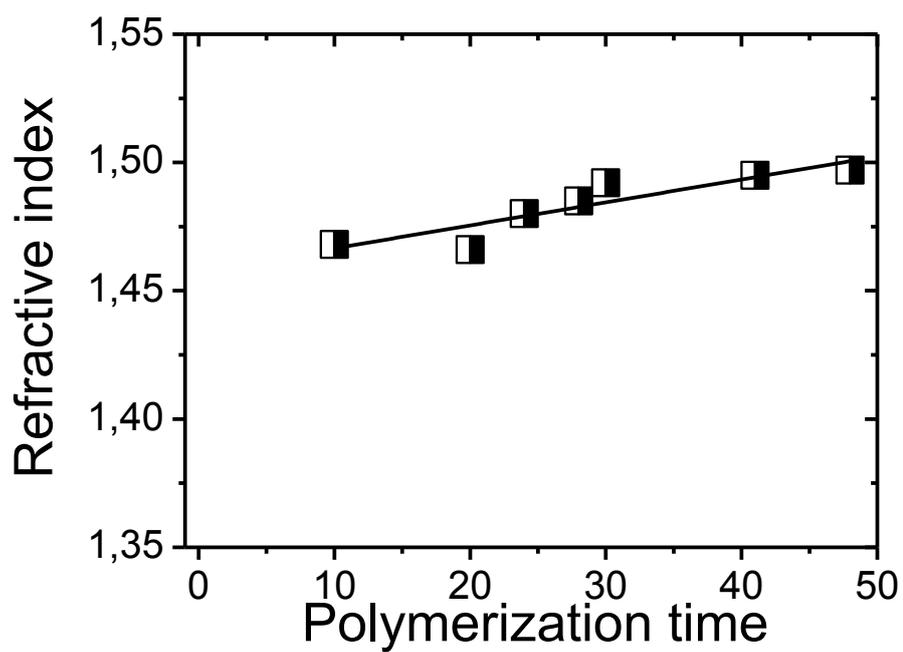


Fig. S3. Refractive index of polymerized PPM brush in dry state, measured by ellipsometry (as prepared at room temperature) as a function of polymerization time. Solid lines are a guide to eye.

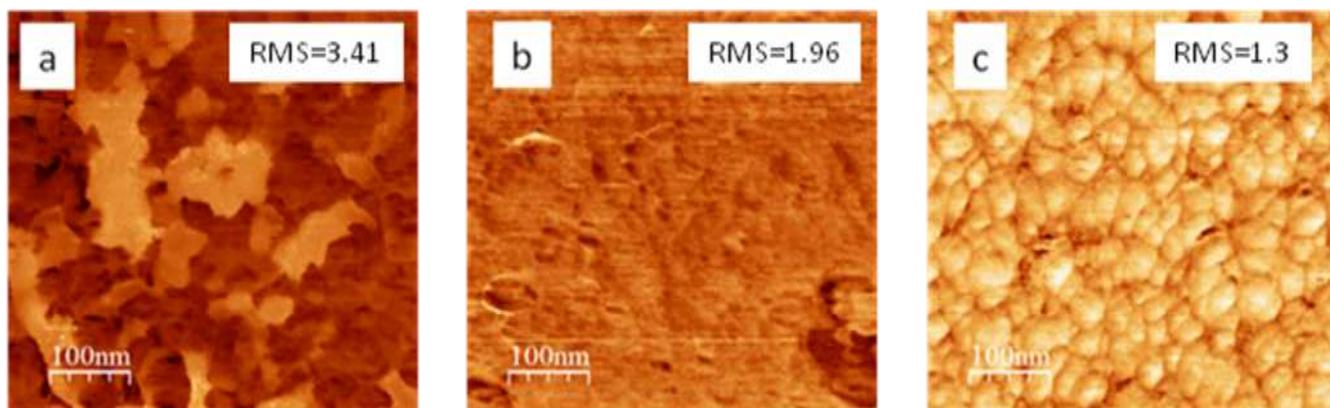


Fig. S4. AFM phase images of the coatings fabricated with polymerization times of 21 (a), 30 (b) and 35 (c) hours

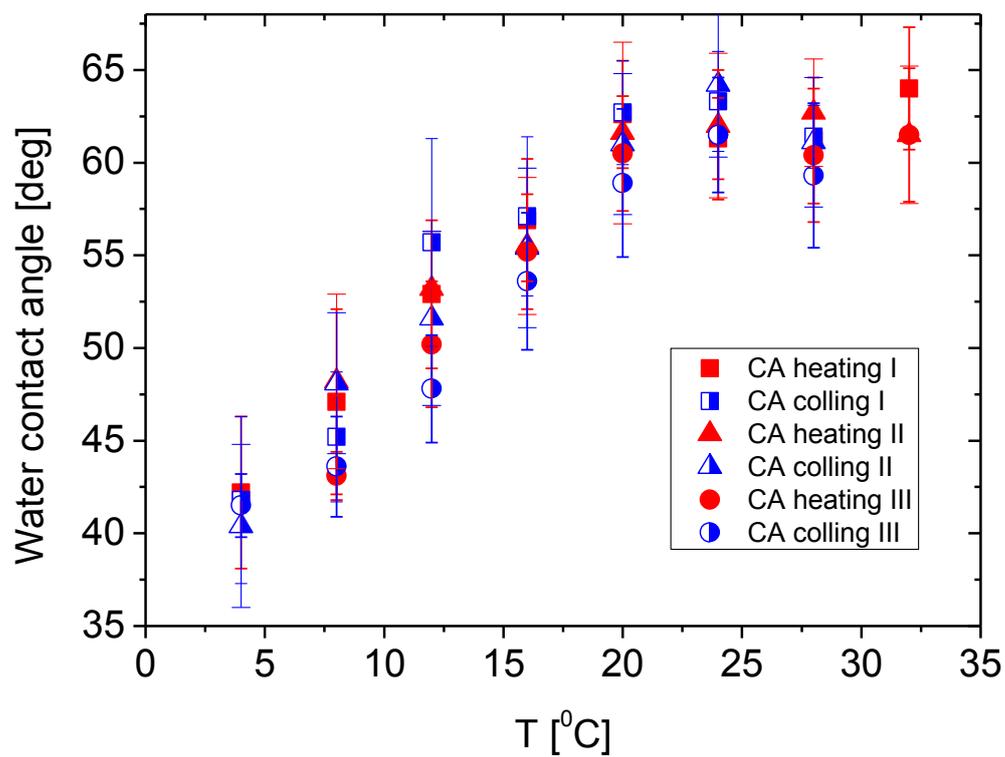


Fig. S5. The temperature dependence of water contact angle (CA) for three subsequent series of heating (red solid symbols) and cooling (blue half-filled symbols), (mean \pm SD, $n = 10$ for every point), determined for the oligoperoxide-graft-PPM coatings fabricated with polymerization time of 30 h.

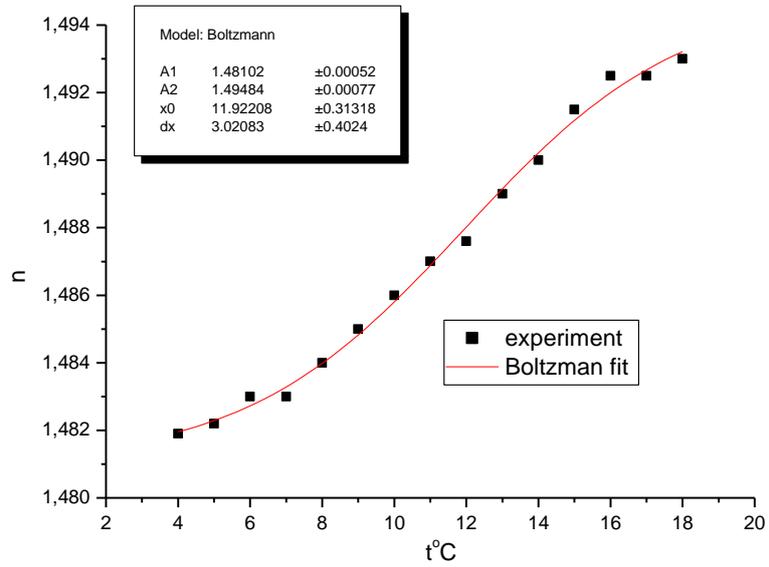
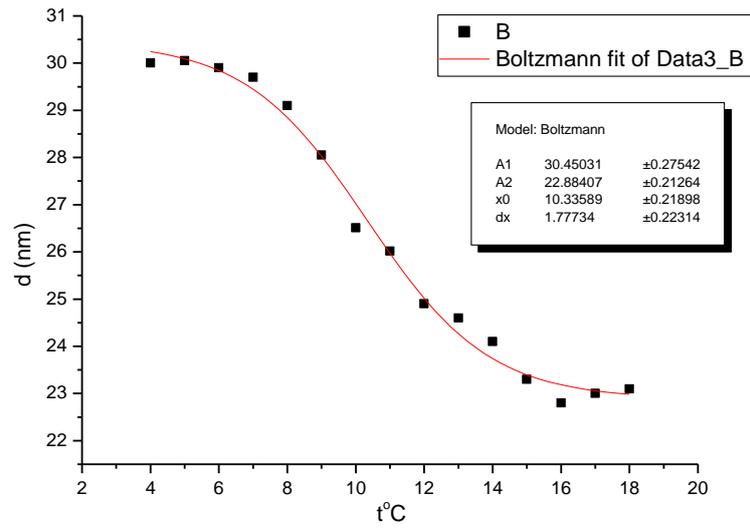


Fig. S6. Temperature-dependent optical characteristics of the PPM coating fabricated for the polymerization time of 30 h.