*Article*

# Effect of Polysorbates on Solids Wettability and Their Adsorption Properties

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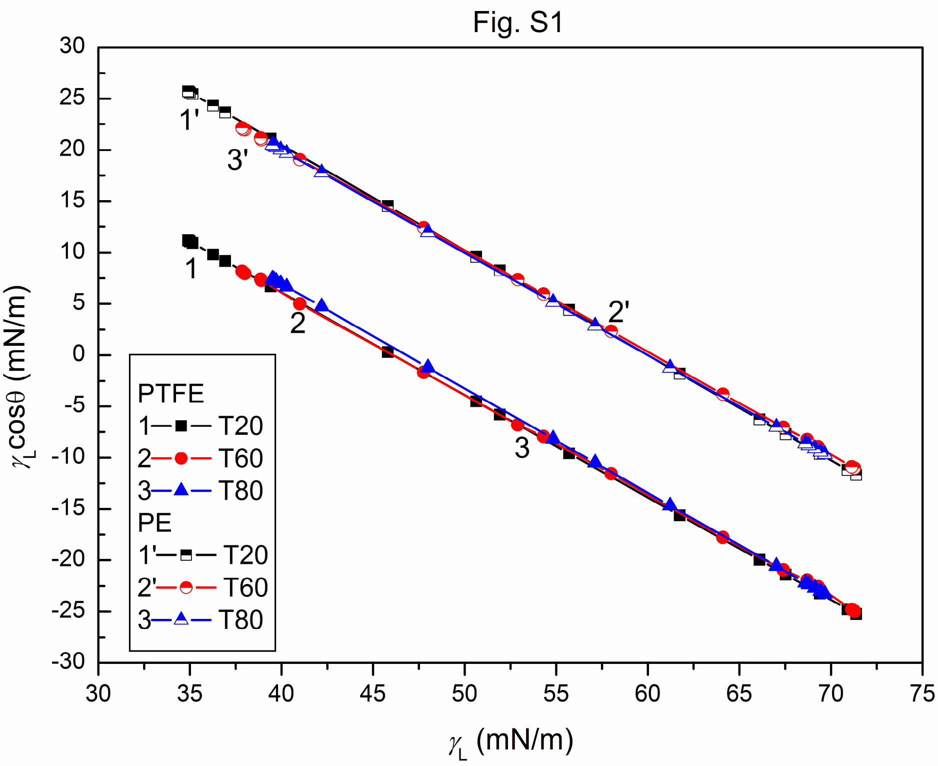


**Fig.** S51 The plot of the adhesion tension ($\gamma_L \cos\theta$) vs. the surface tension of Tween aqueous solutions ($\gamma_L$) for PTFE (curve 1 – 3) and PE (curves 1' – 3'). Curves 1 and 1' correspond to T20, curves 2 and 2' to T60, curves 3 and 3' to T80.

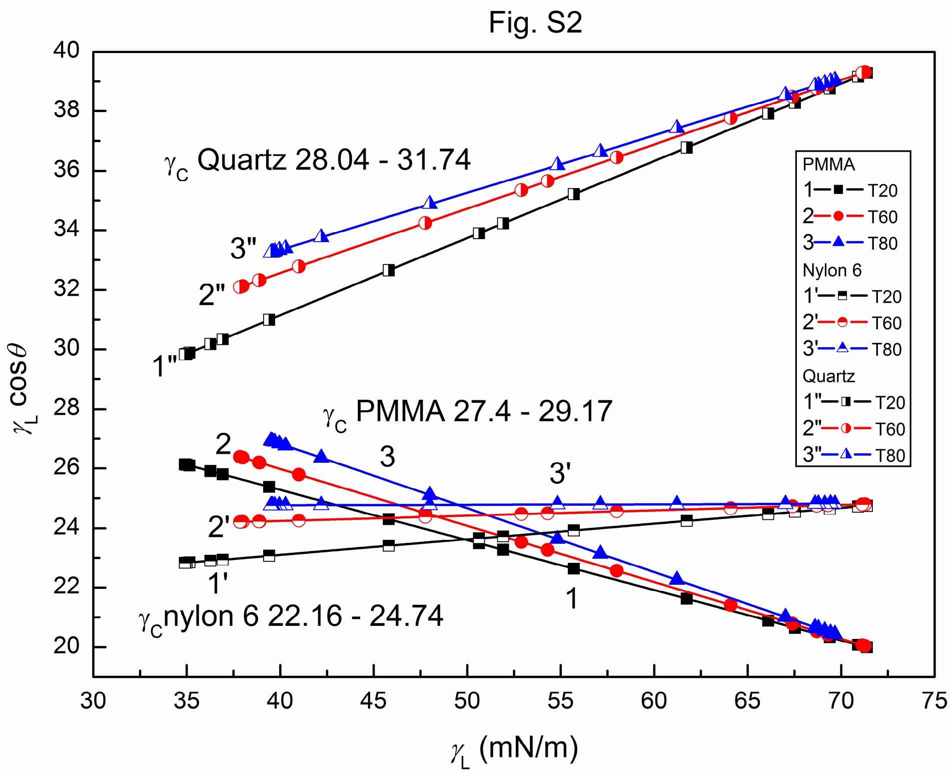


Fig. S2. The plot of the adhesion tension ($\gamma_L \cos\theta$) vs. the surface tension of Tween aqueous solutions ($\gamma_L$) for PMMA (curve 1 – 3), nylon 6 (curves 1' – 3') and quartz (curves 1" – 3"). Curves 1, 1' and 1" correspond to T20, curves 2, 2' and 2" to T60, curves 3, 3' and 3" to T80.

Fig. S3

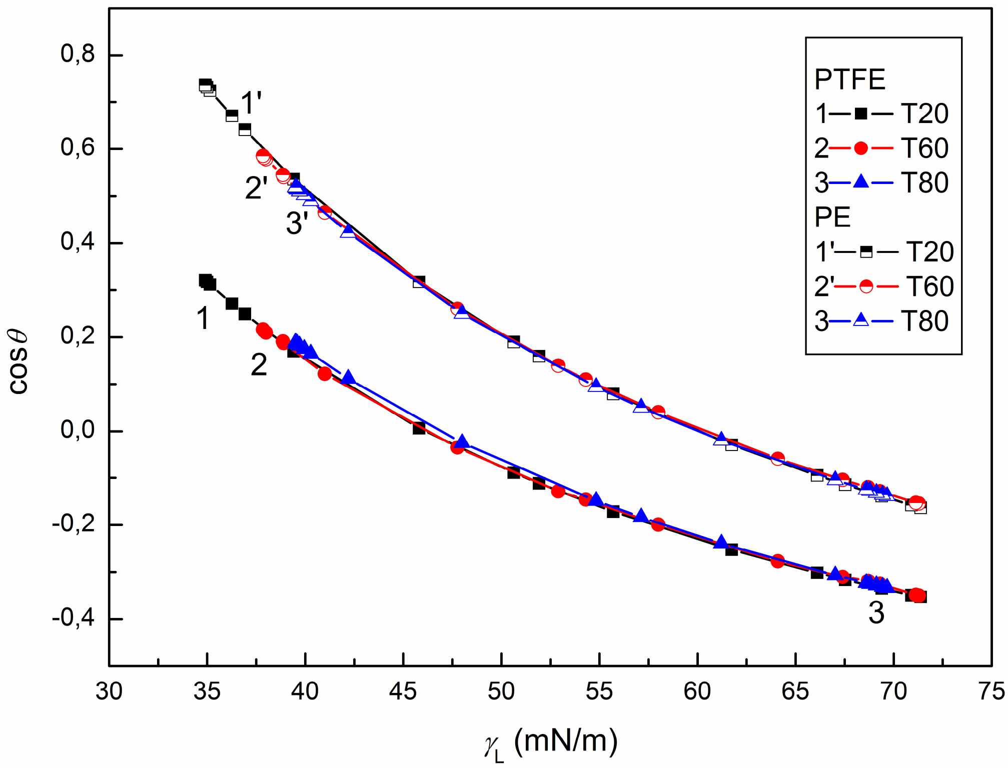


Fig. S3. The plot of the cosine of the contact angle ( $\cos\theta$ ) vs. the surface tension of Tween aqueous solutions ( $\gamma_L$ ) for PTFE (curve 1 – 3) and PE (curves 1' – 3'). Curves 1 and 1' correspond to T20, curves 2 and 2' to T60, curves 3 and 3' to T80.

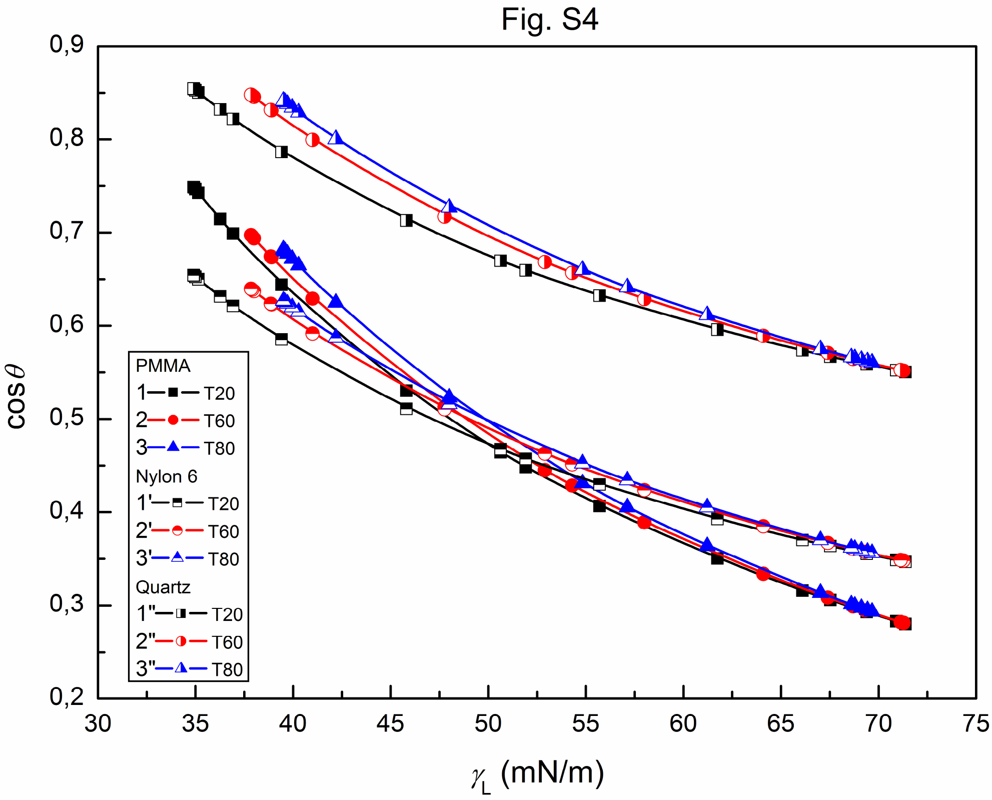


Fig. S4. The plot of the cosine of the contact angle ( $\cos\theta$ ) vs. the surface tension of Tween aqueous solutions ( $\gamma_L$ ) for PMMA (curve 1 – 3), nylon 6 (curves 1' – 3') and quartz (curves 1" – 3"). Curves 1, 1' and 1" correspond to T20, curves 2, 2' and 2" to T60, curves 3, 3' and 3" to T80.

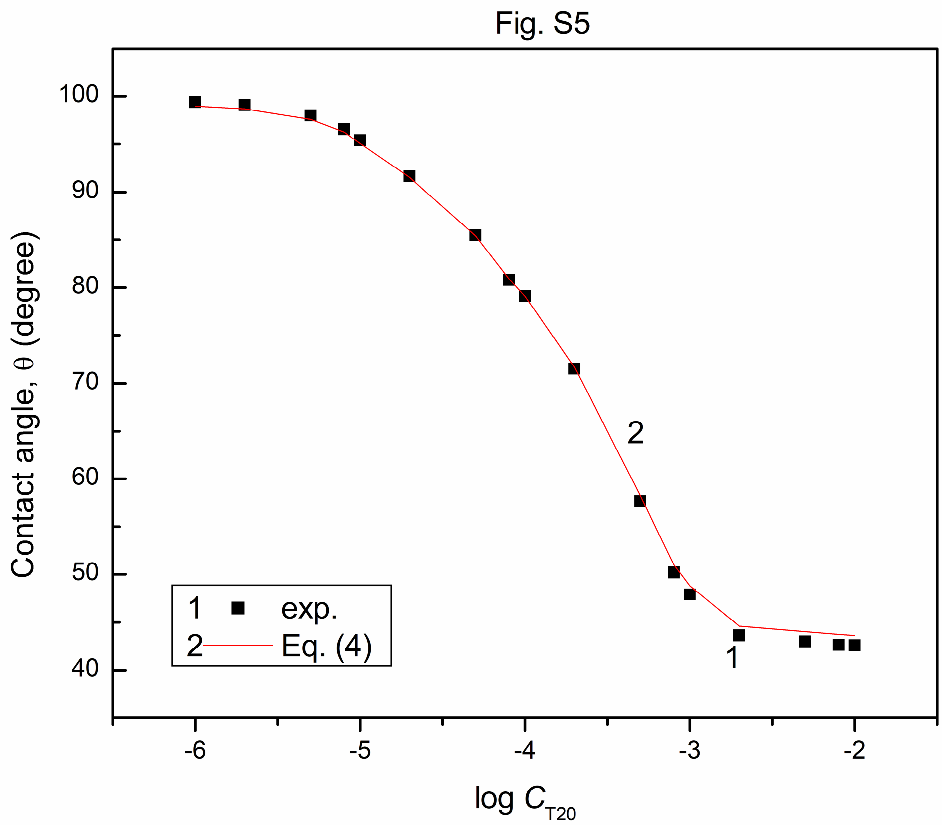


Fig. S5. A plot of the measured (points 1) and calculated from Eq. (4) (curve 2) the values of contact angle ($\theta$) of the T20 aqueous solutions on the PE vs. the logarithm of its concentration (log *C*).

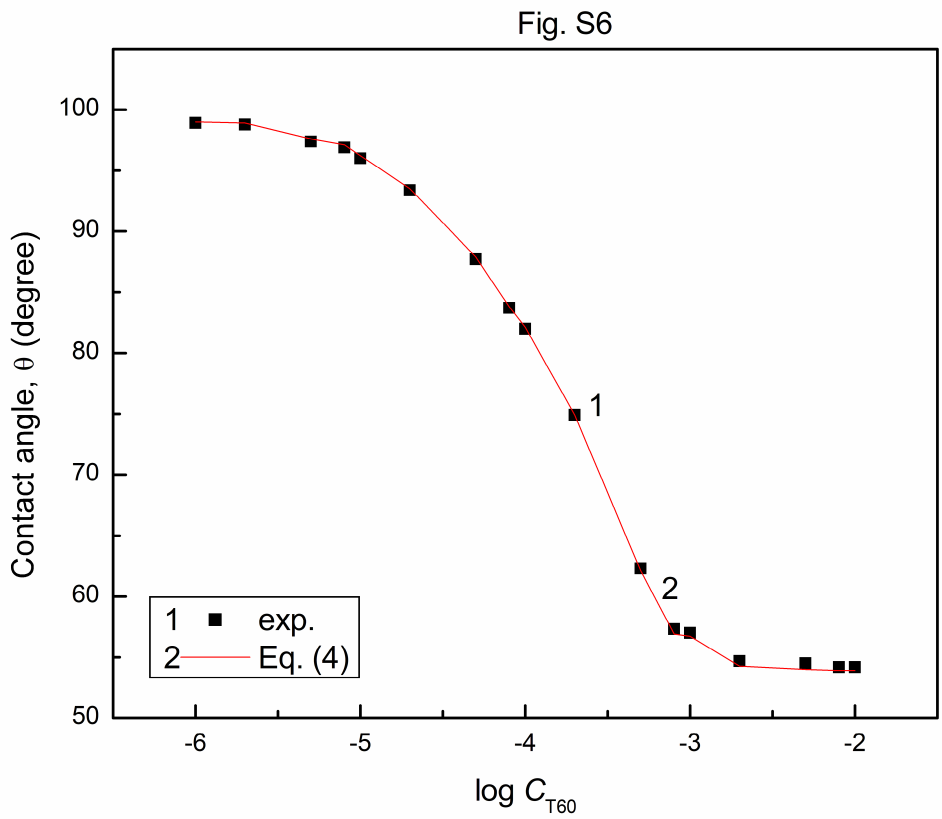


Fig. S6. A plot of the measured (points 1) and calculated from Eq. (4) (curve 2) the values of contact angle ($\theta$) of the T60 aqueous solutions on the PE vs. the logarithm of its concentration (log $C$).

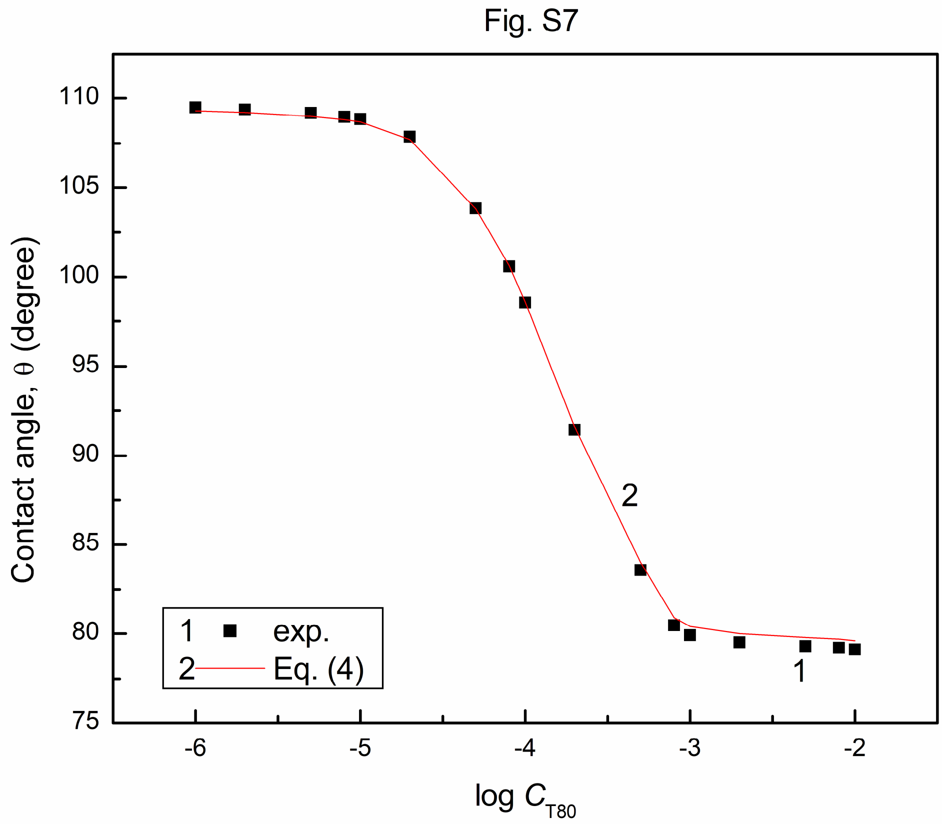


Fig. S7. A plot of the measured (points 1) and calculated from Eq. (4) (curve 2) the values of contact angle ($\theta$) of the T80 aqueous solutions on the PE vs. the logarithm of its concentration (log $C$).

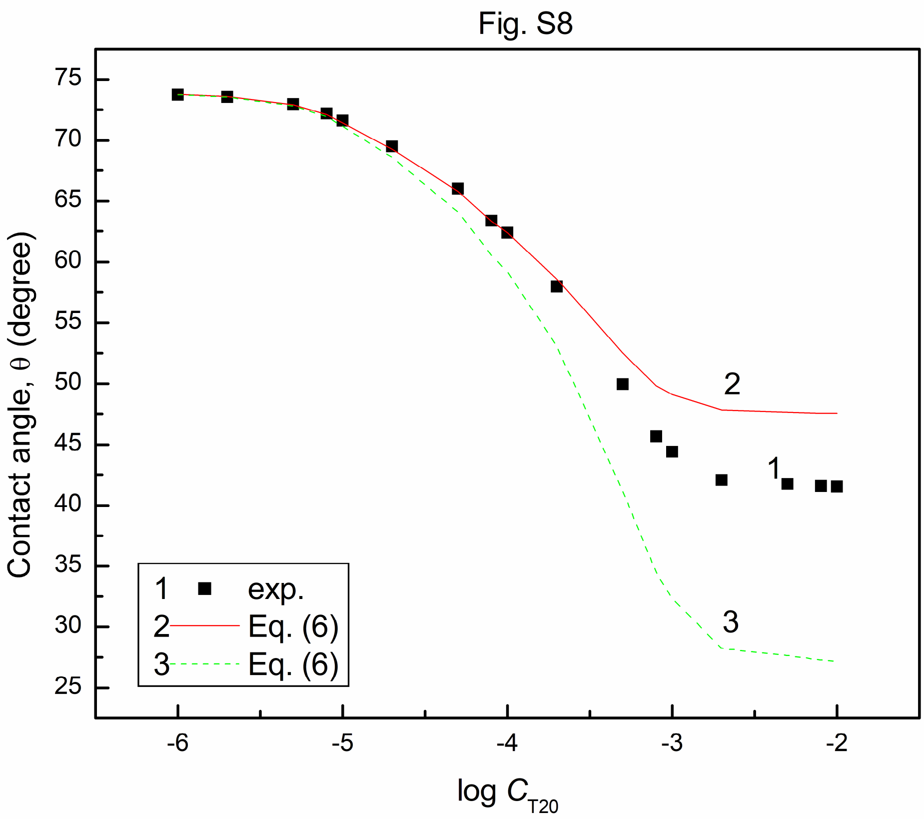


Fig. S8. A plot of the measured (points 1) and calculated from Eq. (6) (curves 2 and 3) the values of contact angle ($\theta$) of T20 aqueous solutions on PMMA vs. the logarithm of its concentration (log *C*). Curve 2 - calculated for $\pi = \frac{\gamma_W - \gamma_L}{2}$, curve 3 - for $\pi$ calculated on the basis of Eq. (7) (surface tension of solid from contact angle of water minus surface tension of solid from contact angle of solution).

Fig. S9

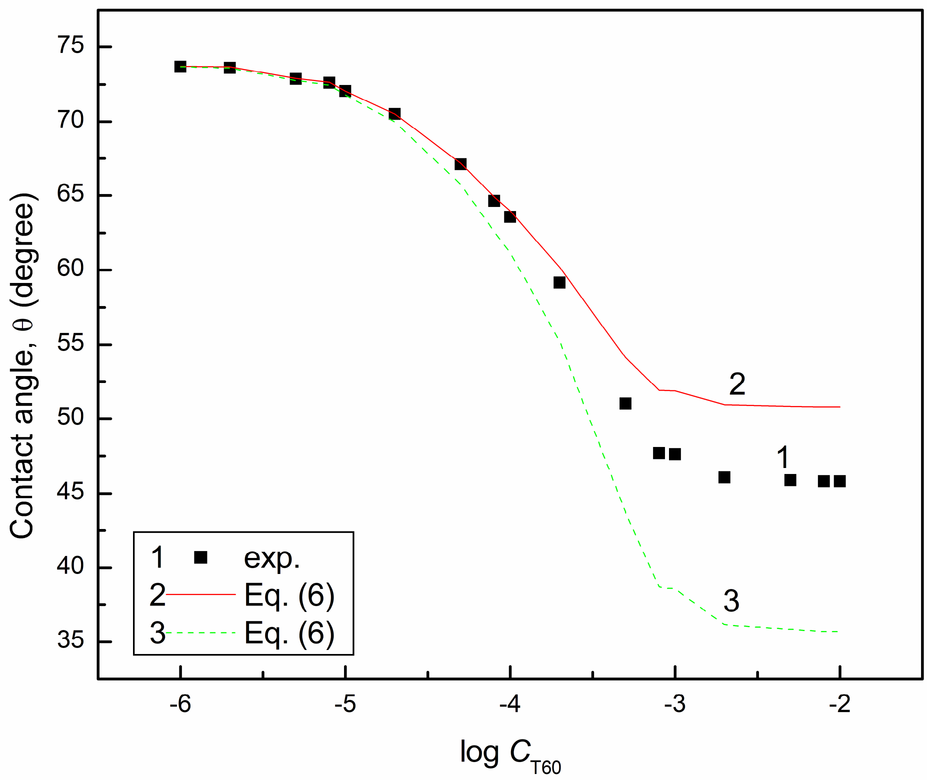


Fig. S9. A plot of the measured (points 1) and calculated from Eq. (6) (curves 2 and 3) the values of contact angle ($\theta$) of T60 aqueous solutions on PMMA vs. the logarithm of its concentration (log $C$). Curve 2 - calculated for $\pi = \frac{\gamma_W - \gamma_L}{2}$, curve 3 - for $\pi$ calculated on the basis of Eq. (7) (surface tension of solid from contact angle of water minus surface tension of solid from contact angle of solution).

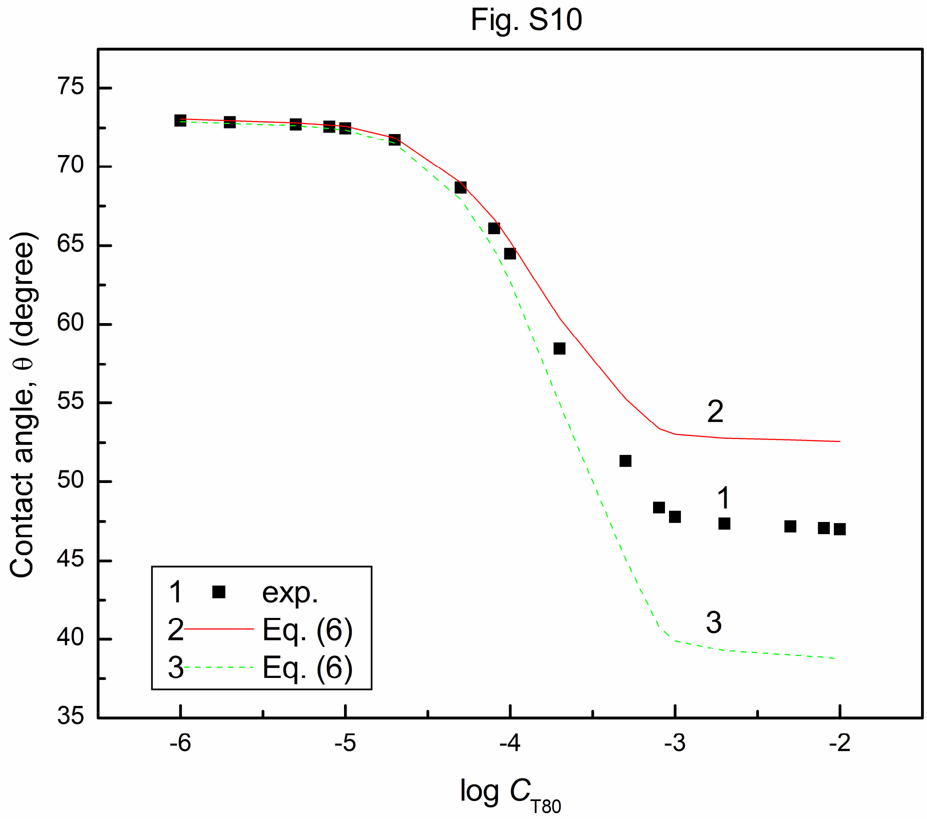


Fig. S10. A plot of the measured (points 1) and calculated from Eq. (6) (curves 2 and 3) the values of contact angle ($\theta$) of T80 aqueous solutions on PMMA vs. the logarithm of its concentration (log *C*). Curve 2 - calculated for $\pi = \frac{\gamma_W - \gamma_L}{2}$, curve 3 - for $\pi$ calculated on the basis of Eq. (7) (surface tension of solid from contact angle of water minus surface tension of solid from contact angle of solution).

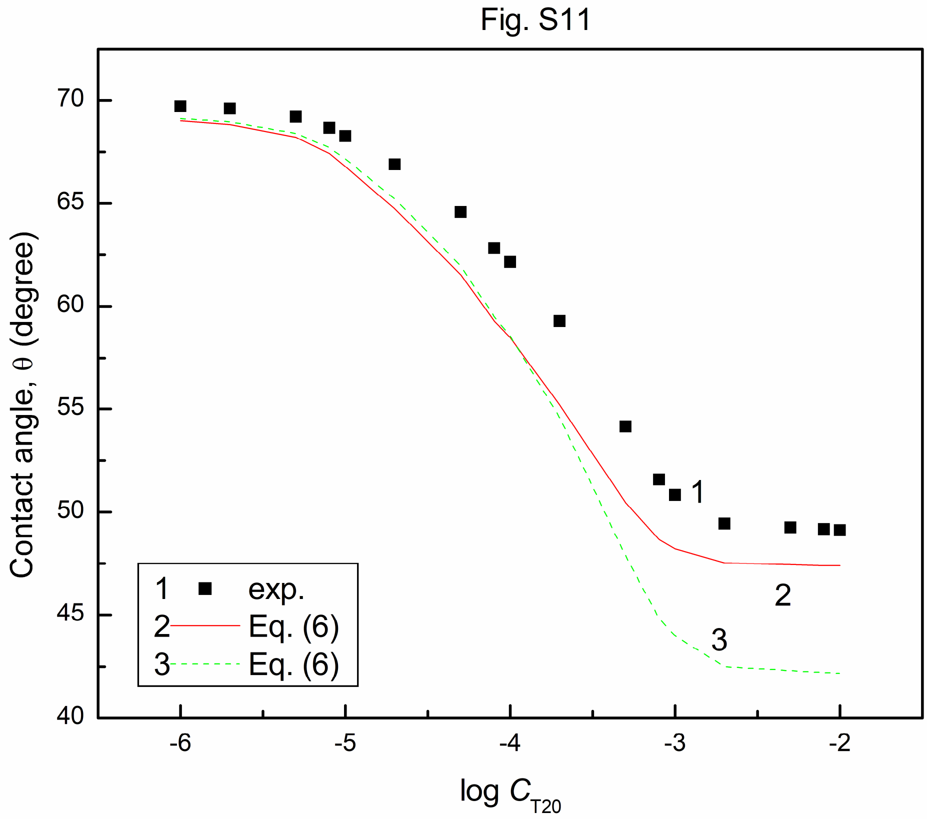


Fig. S11. A plot of the measured (points 1) and calculated from Eq. (6) (curves 2 and 3) the values of contact angle ($\theta$) of T20 aqueous solutions on nylon 6 vs. the logarithm of its concentration (log *C*). Curve 2 - calculated for $\pi = \frac{\gamma_W - \gamma_L}{2}$, curve 3 - for $\pi$ calculated on the basis of Eq. (7) (surface tension of solid from contact angle of water minus surface tension of solid from contact angle of solution).

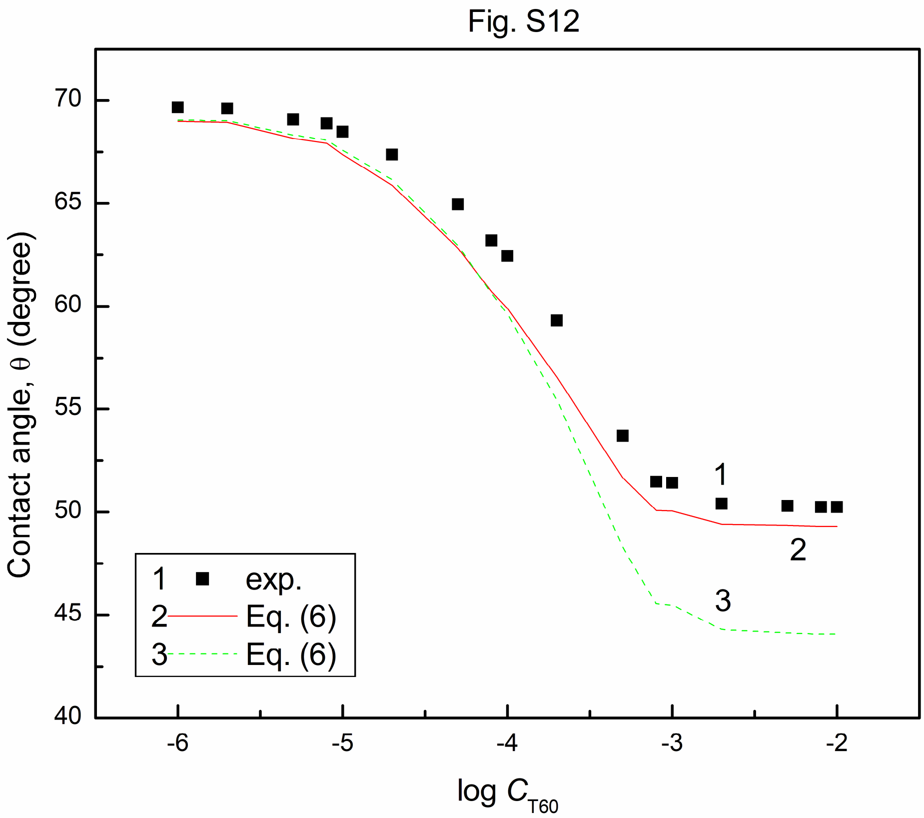


Fig. S12. A plot of the measured (points 1) and calculated from Eq. (6) (curves 2 and 3) the values of contact angle ($\theta$) of T60 aqueous solutions on nylon 6 vs. the logarithm of its concentration (log $C$). Curve 2 - calculated for $\pi = \frac{\gamma_W - \gamma_L}{2}$, curve 3 - for $\pi$ calculated on the basis of Eq. (7) (surface tension of solid from contact angle of water minus surface tension of solid from contact angle of solution).

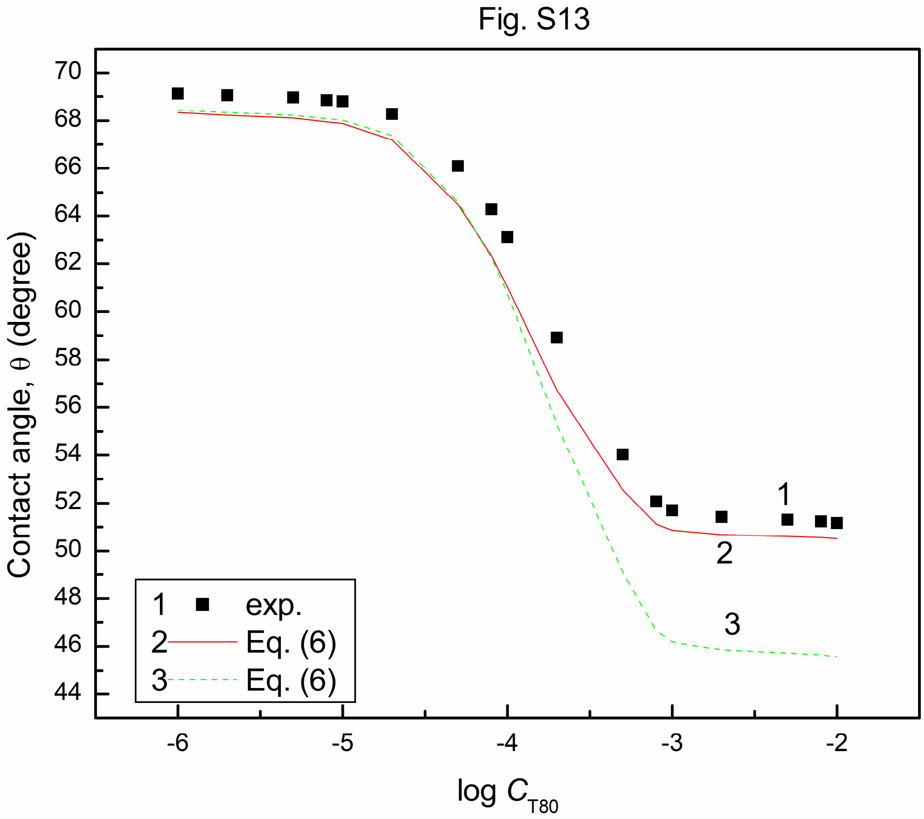


Fig. S13. A plot of the measured (points 1) and calculated from Eq. (6) (curves 2 and 3) the values of contact angle ( $\theta$ ) of T80 aqueous solutions on nylon 6 vs. the logarithm of its concentration (log $C$). Curve 2 - calculated for $\pi = \dfrac{\gamma_W - \gamma_L}{2}$, curve 3 - for $\pi$ calculated on the basis of Eq. (7) (surface tension of solid from contact angle of water minus surface tension of solid from contact angle of solution).

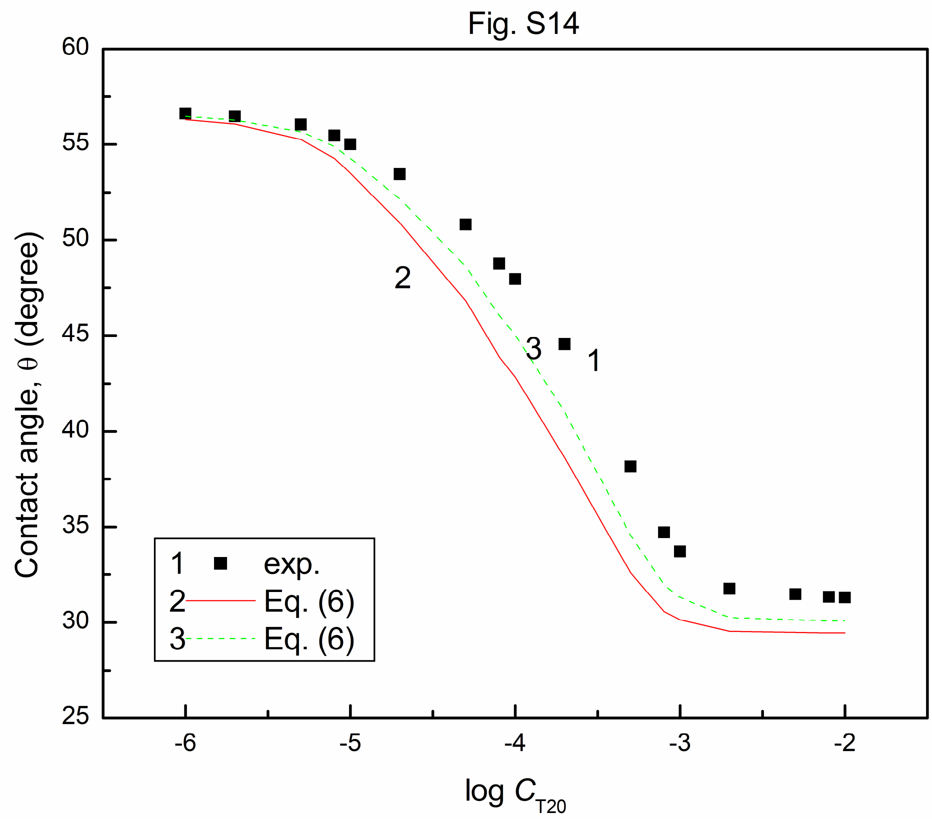


Fig. S14. A plot of the measured (points 1) and calculated from Eq. (6) (curves 2 and 3) the values of contact angle ($\theta$) of T20 aqueous solutions on quartz vs. the logarithm of its concentration (log C). Curve 2 - calculated for $\pi = \frac{\gamma_W - \gamma_L}{2}$, curve 3 - for $\pi$ calculated on the basis of Eq. (7) (surface tension of solid from contact angle of water minus surface tension of solid from contact angle of solution).

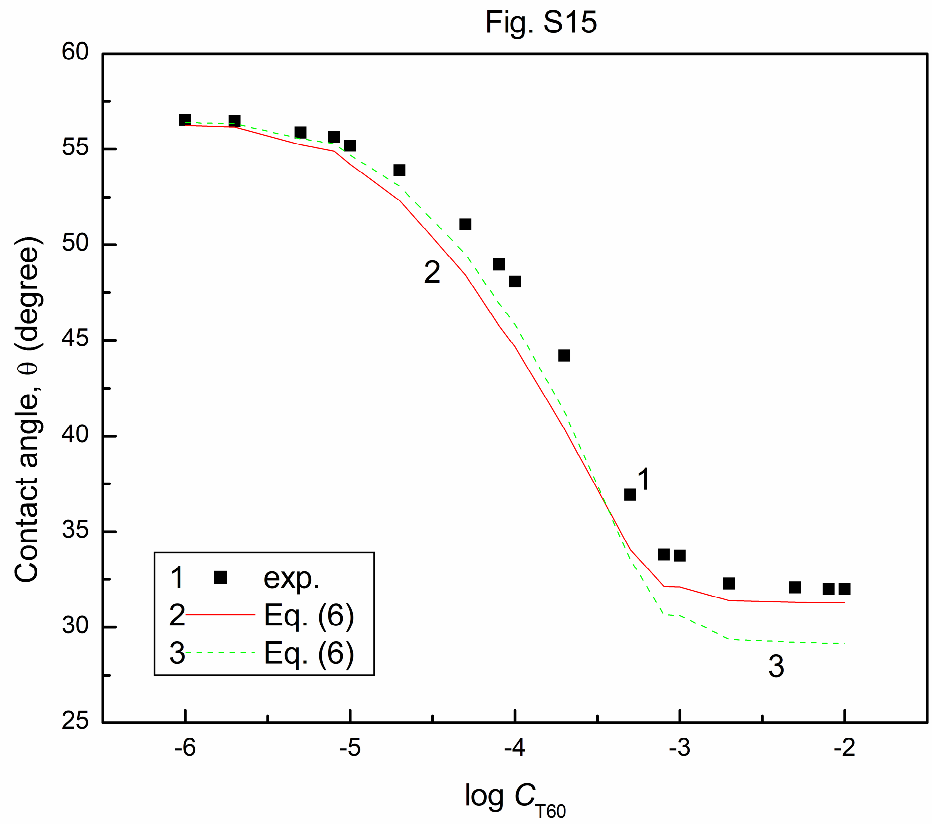


Fig. S15. A plot of the measured (points 1) and calculated from Eq. (6) (curves 2 and 3) the values of contact angle ( $\theta$ ) of T60 aqueous solutions on quartz vs. the logarithm of its concentration (log $C$). Curve 2 - calculated for $\pi = \frac{\gamma_W - \gamma_L}{2}$, curve 3 - for $\pi$ calculated on the basis of Eq. (7) (surface tension of solid from contact angle of water minus surface tension of solid from contact angle of solution).

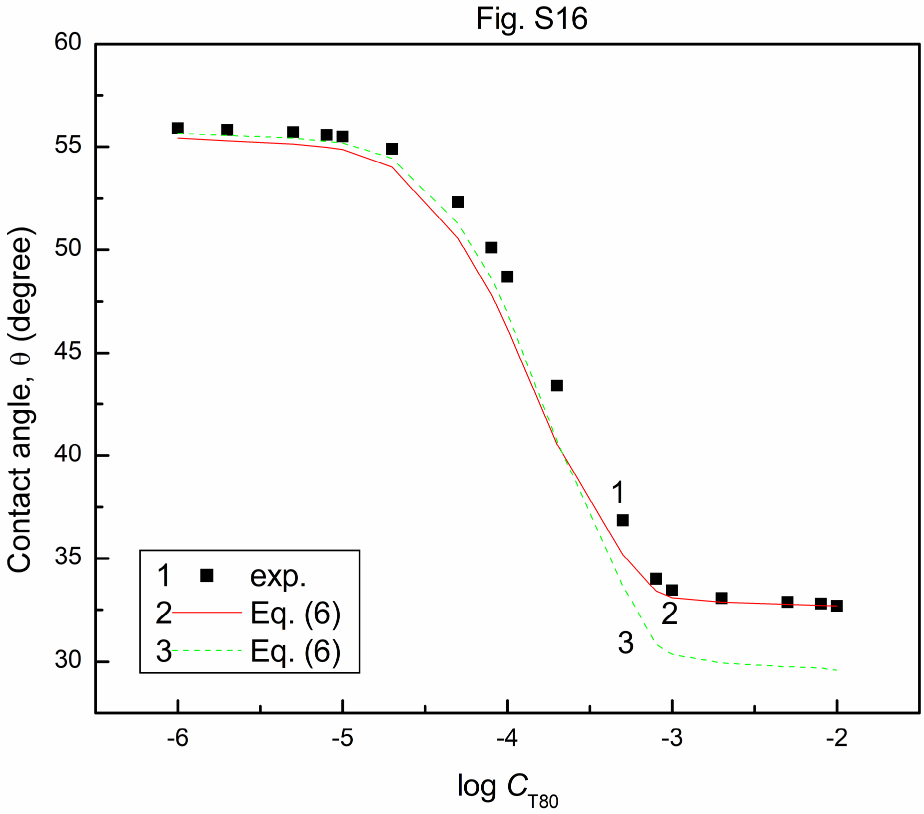


Fig. S16. A plot of the measured (points 1) and calculated from Eq. (6) (curves 2 and 3) the values of contact angle ($\theta$) of T80 aqueous solutions on quartz vs. the logarithm of its concentration (log *C*). Curve 2 - calculated for $\pi = \dfrac{\gamma_W - \gamma_L}{2}$, curve 3 - for $\pi$ calculated on the basis of Eq. (7) (surface tension of solid from contact angle of water minus surface tension of solid from contact angle of solution).

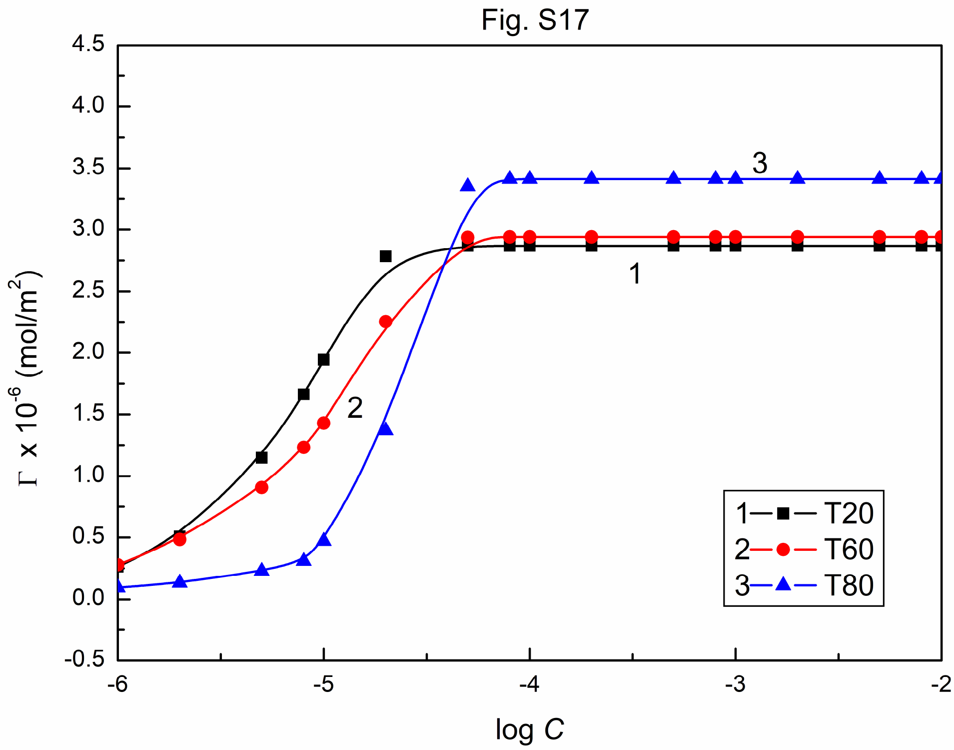


Fig. S17. The plot of the Gibbs surface excess concentration (Γ) of T20 (curve 1), T60 (curve 2) and T80 (curve 3) at the PTFE-water interface calculated from Eq. (8) vs. the logarithm of their concentration (log *C*).

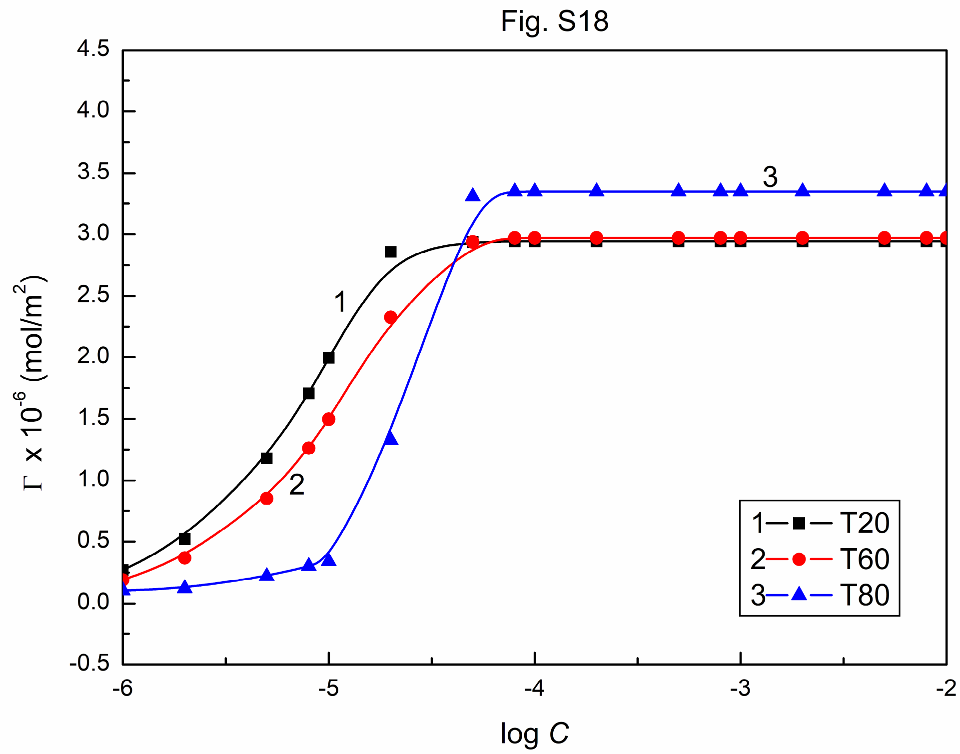


Fig. S18. The plot of the Gibbs surface excess concentration ( Γ ) of T20 (curve 1), T60 (curve 2) and T80 (curve 3) at the PE-water interface calculated from Eq. (8) vs. the logarithm of their concentration (log *C*).

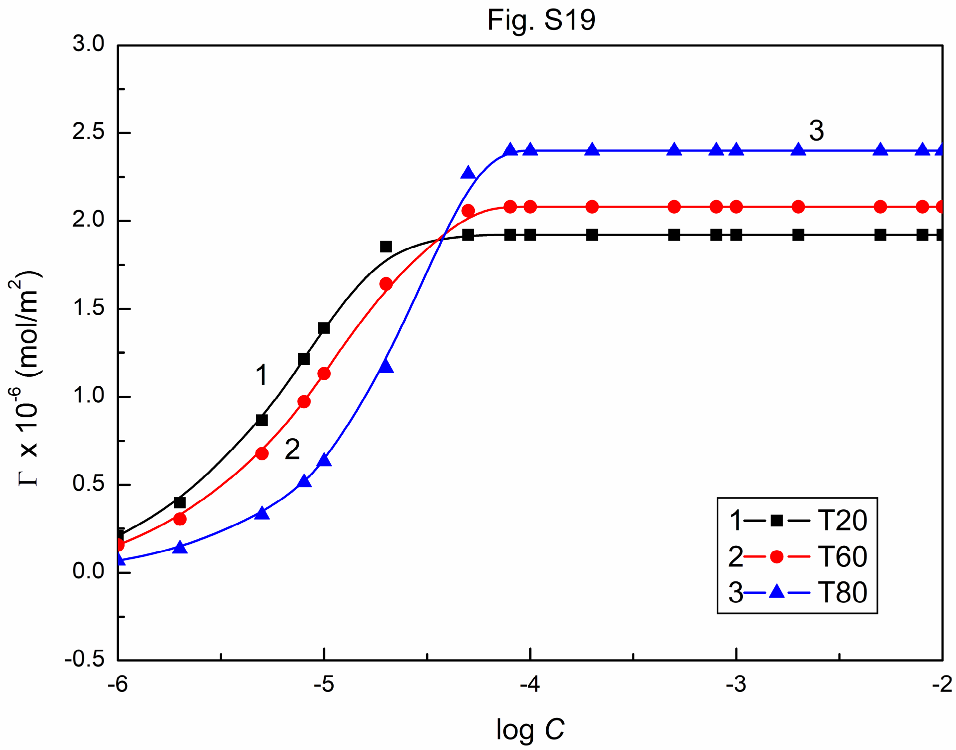


Fig. S19. The plot of the Gibbs surface excess concentration ( Γ ) of T20 (curve 1), T60 (curve 2) and T80 (curve 3) at the PMMA-water interface calculated from Eq. (9) vs. the logarithm of their concentration (log *C*).

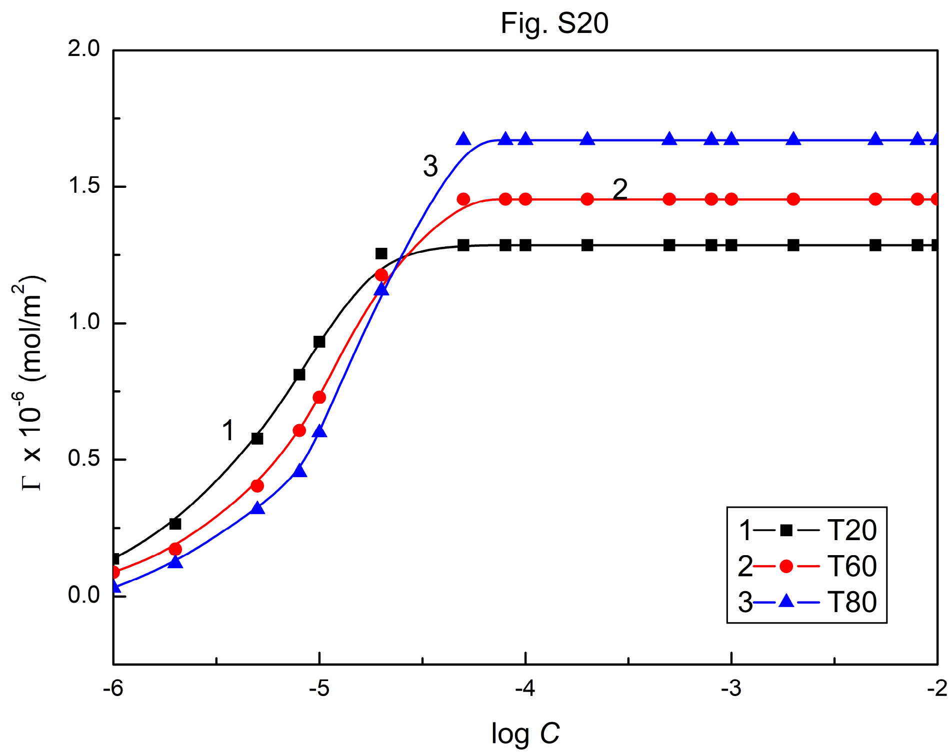


Fig. S20. The plot of the Gibbs surface excess concentration (Γ) of T20 (curve 1), T60 (curve 2) and T80 (curve 3) at the nylon 6-water interface calculated from Eq. (9) vs. the logarithm of their concentration (log *C*).

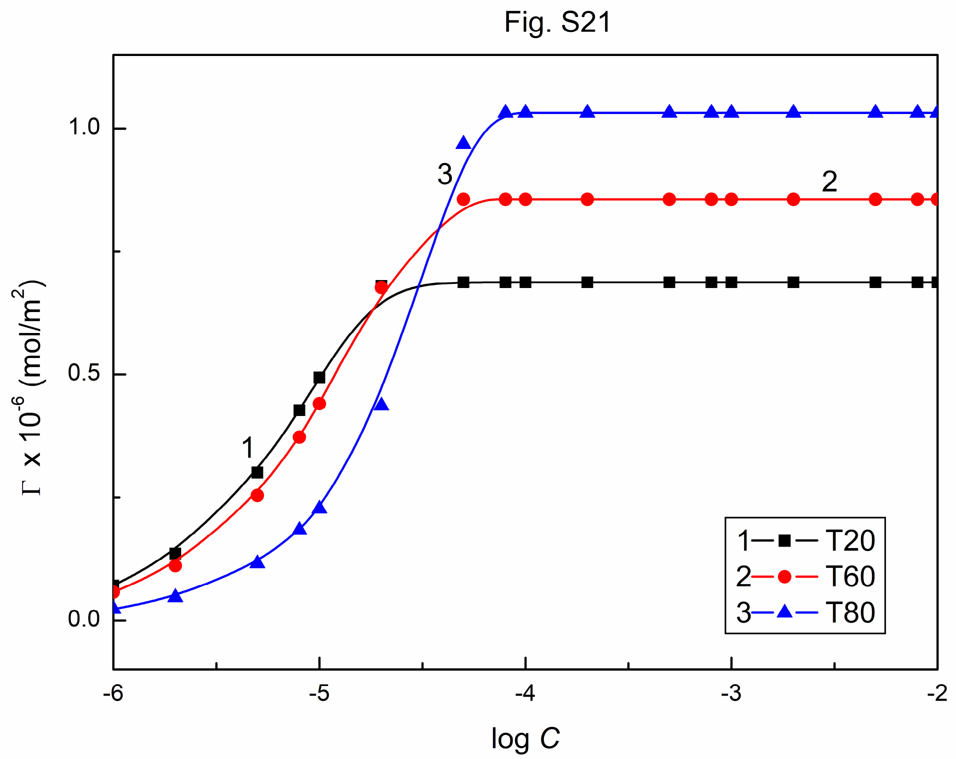


Fig. S21. The plot of the Gibbs surface excess concentration (Γ) of T20 (curve 1), T60 (curve 2) and T80 (curve 3) at the quartz-water interface calculated from Eq. (9) vs. the logarithm of their concentration (log *C*).

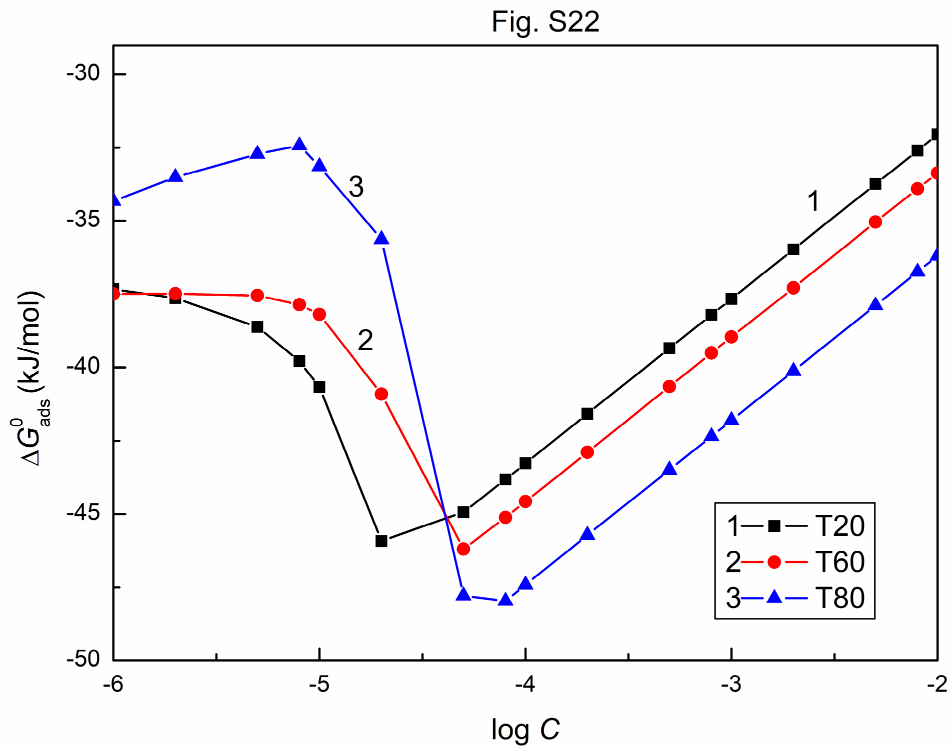


Fig. S22. The plot of the Gibbs standard free energy of adsorption ($\Delta G^{0}_{ads}$) of T20 (curve 1), T60 (curve 2) and T80 (curve 3) at PTFE calculated from Eq. (11) vs. the logarithm of their concentration (log $C$).

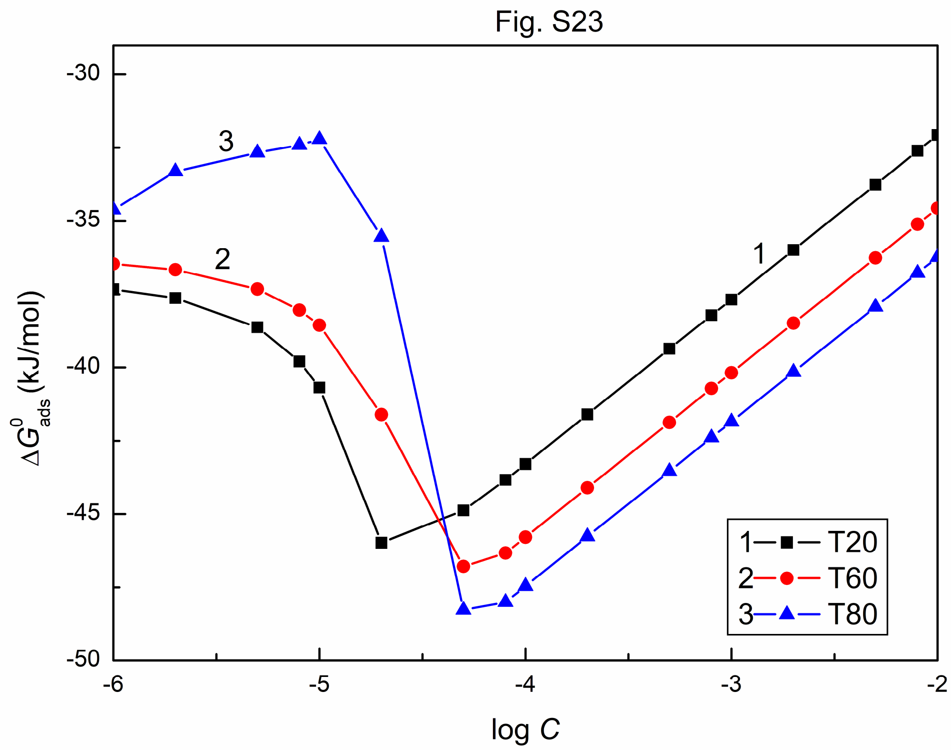


Fig. S23. The plot of the Gibbs standard free energy of adsorption ($\Delta G^0_{ads}$) of T20 (curve 1), T60 (curve 2) and T80 (curve 3) at PE calculated from Eq. (11) vs. the logarithm of their concentration (log $C$).

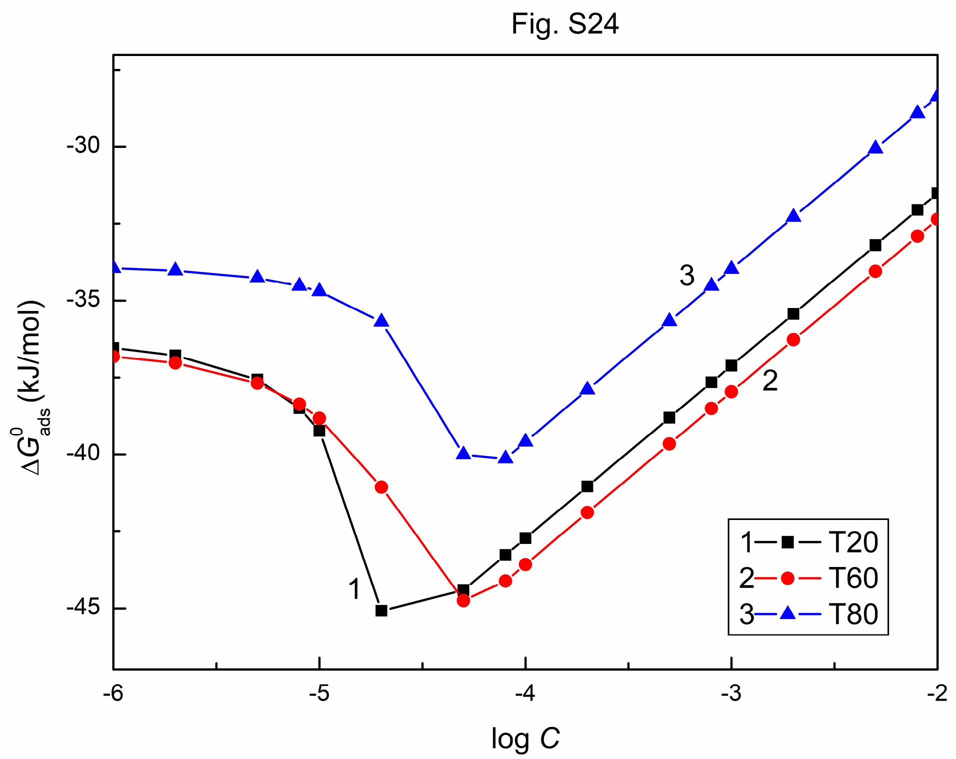


Fig. S24. The plot of the Gibbs standard free energy of adsorption ($\Delta G^0_{ads}$) of T20 (curve 1), T60 (curve 2) and T80 (curve 3) at PMMA calculated from Eq. (11) vs. the logarithm of their concentration (log $C$).

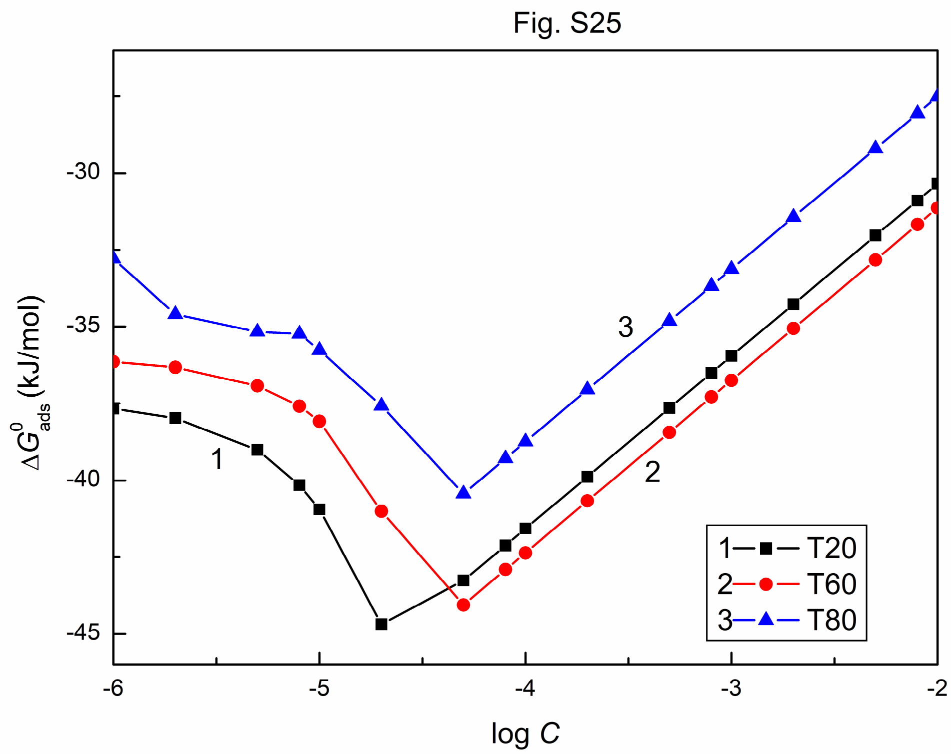


Fig. S25. The plot of the Gibbs standard free energy of adsorption ($\Delta G^0_{ads}$) of T20 (curve 1), T60 (curve 2) and T80 (curve 3) at nylon 6 calculated from Eq. (11) vs. the logarithm of their concentration (log $C$).

Fig. S26

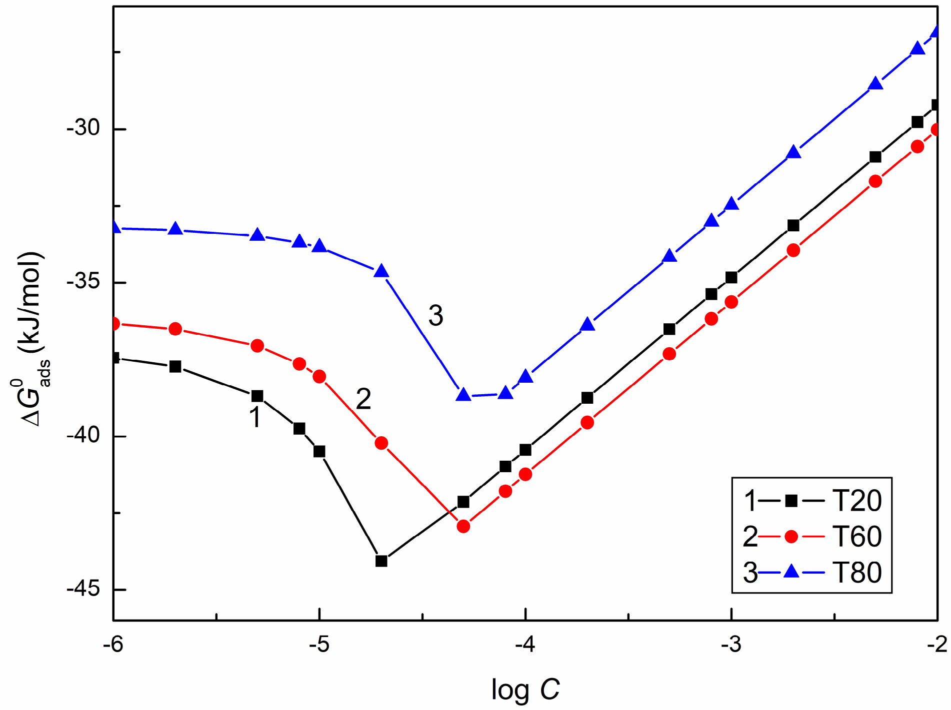


Fig. S26. The plot of the Gibbs standard free energy of adsorption ($\Delta G^0_{ads}$) of T20 (curve 1), T60 (curve 2) and T80 (curve 3) at quartz calculated from Eq. (11) vs. the logarithm of their concentration (log $C$).

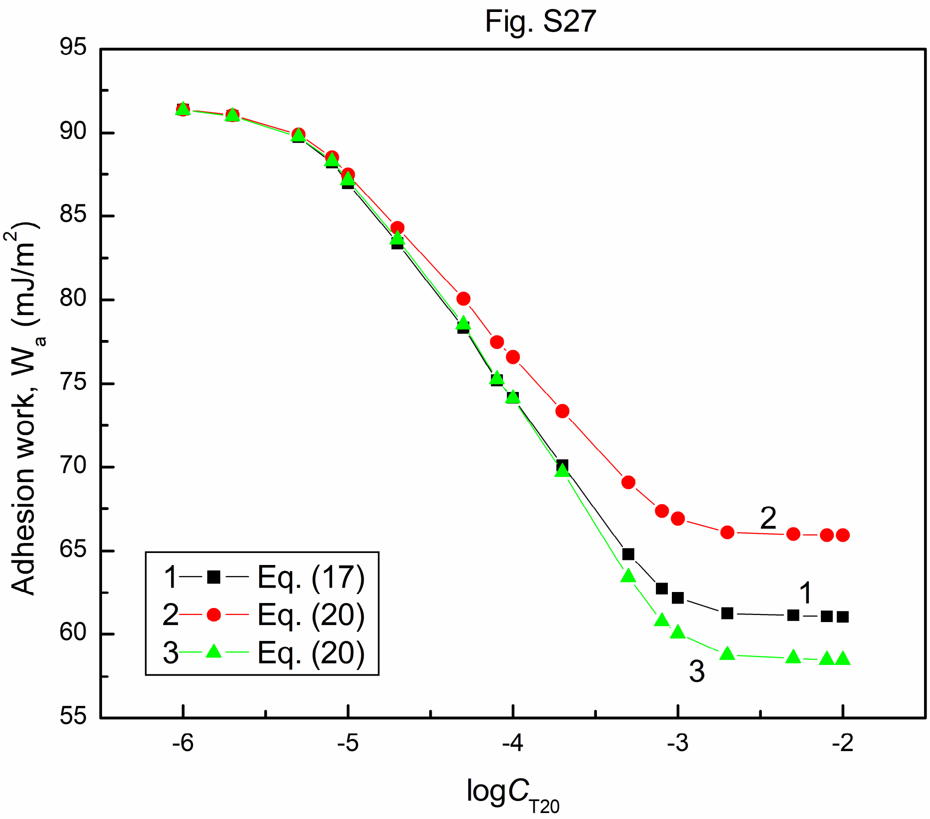


Fig. S27. The plot of adhesion work ($W_a$) of aqueous solutions of T20 to PMMA calculated from Eqs. (17) (curve 1) and Eq. (20) (curves 2 and 3) vs. the logarithm of its concentration (log *C*). Curve 2 - for $\pi$ calculated on the basis of Eq. (7) (surface tension of solid from contact angle of water minus surface tension of solid from contact angle of solution), curve 3 - calculated for $\pi = \frac{\gamma_W - \gamma_L}{2}$.

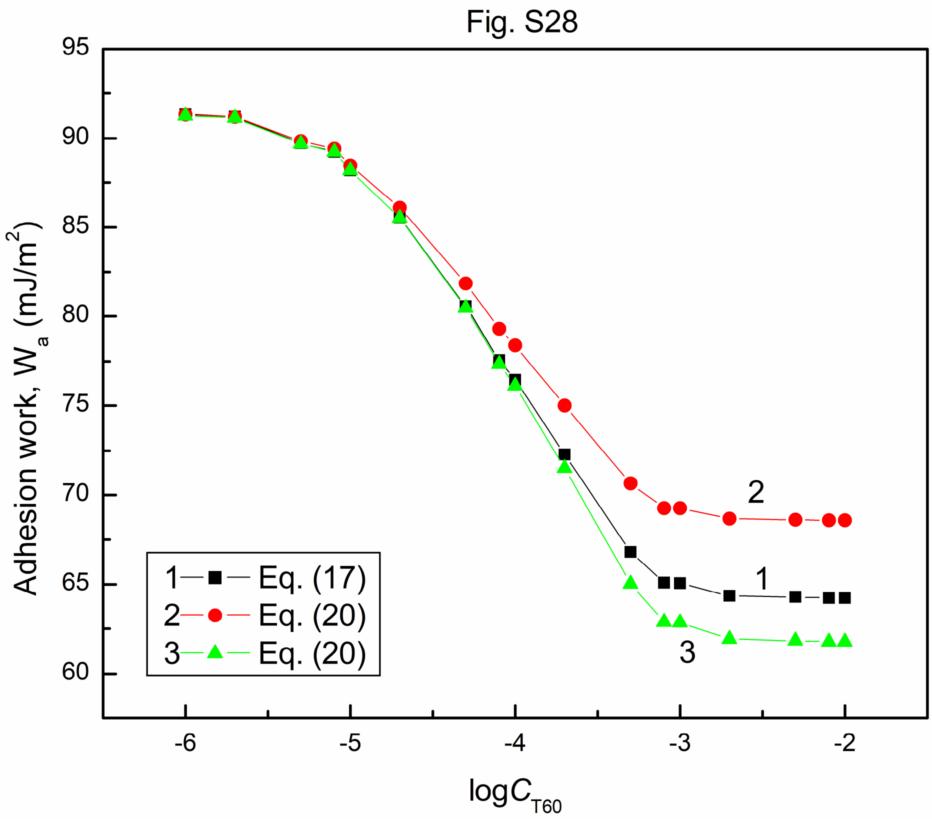


Fig. S28. The plot of adhesion work ($W_a$) of aqueous solutions of T60 to PMMA calculated from Eqs. (17) (curve 1) and Eq. (20) (curves 2 and 3) vs. the logarithm of its concentration (log $C$). Curve 2 - for $\pi$ calculated on the basis of Eq. (7) (surface tension of solid from contact angle of water minus surface tension of solid from contact angle of solution), curve 3 - calculated for $\pi = \frac{\gamma_W - \gamma_L}{2}$.

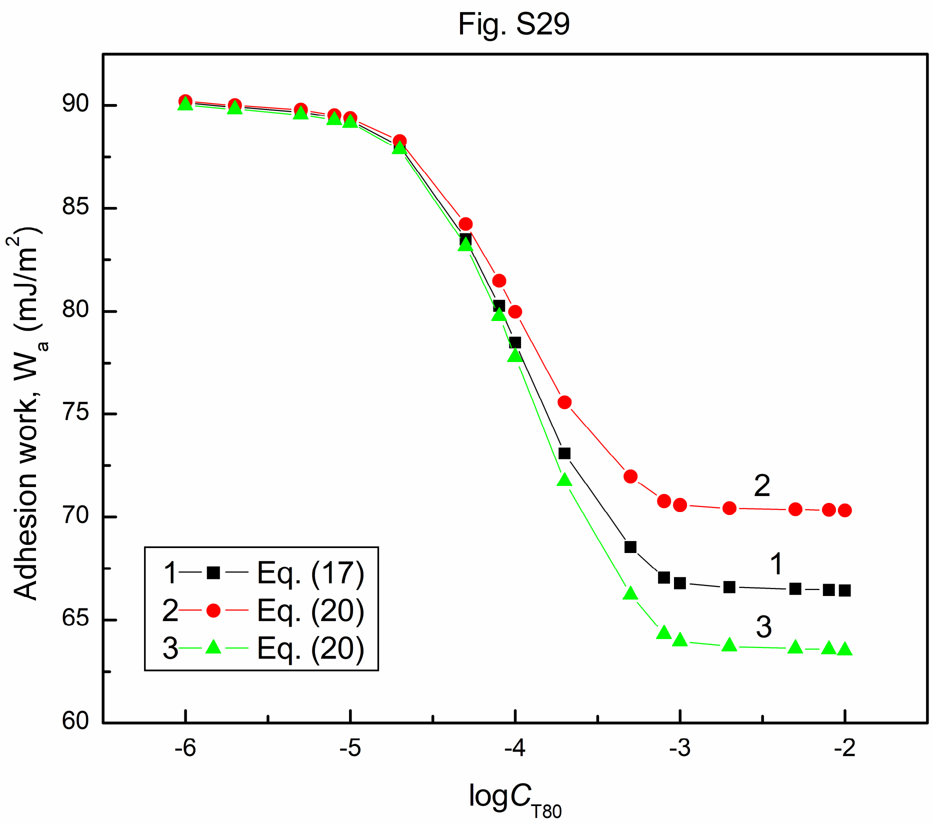


Fig. S29. The plot of adhesion work ($W_a$) of aqueous solutions of T80 to PMMA calculated from Eqs. (17) (curve 1) and Eq. (20) (curves 2 and 3) vs. the logarithm of its concentration (log *C*). Curve 2 - for $\pi$ calculated on the basis of Eq. (7) (surface tension of solid from contact angle of water minus surface tension of solid from contact angle of solution), curve 3 - calculated for $\pi = \dfrac{\gamma_W - \gamma_L}{2}$.

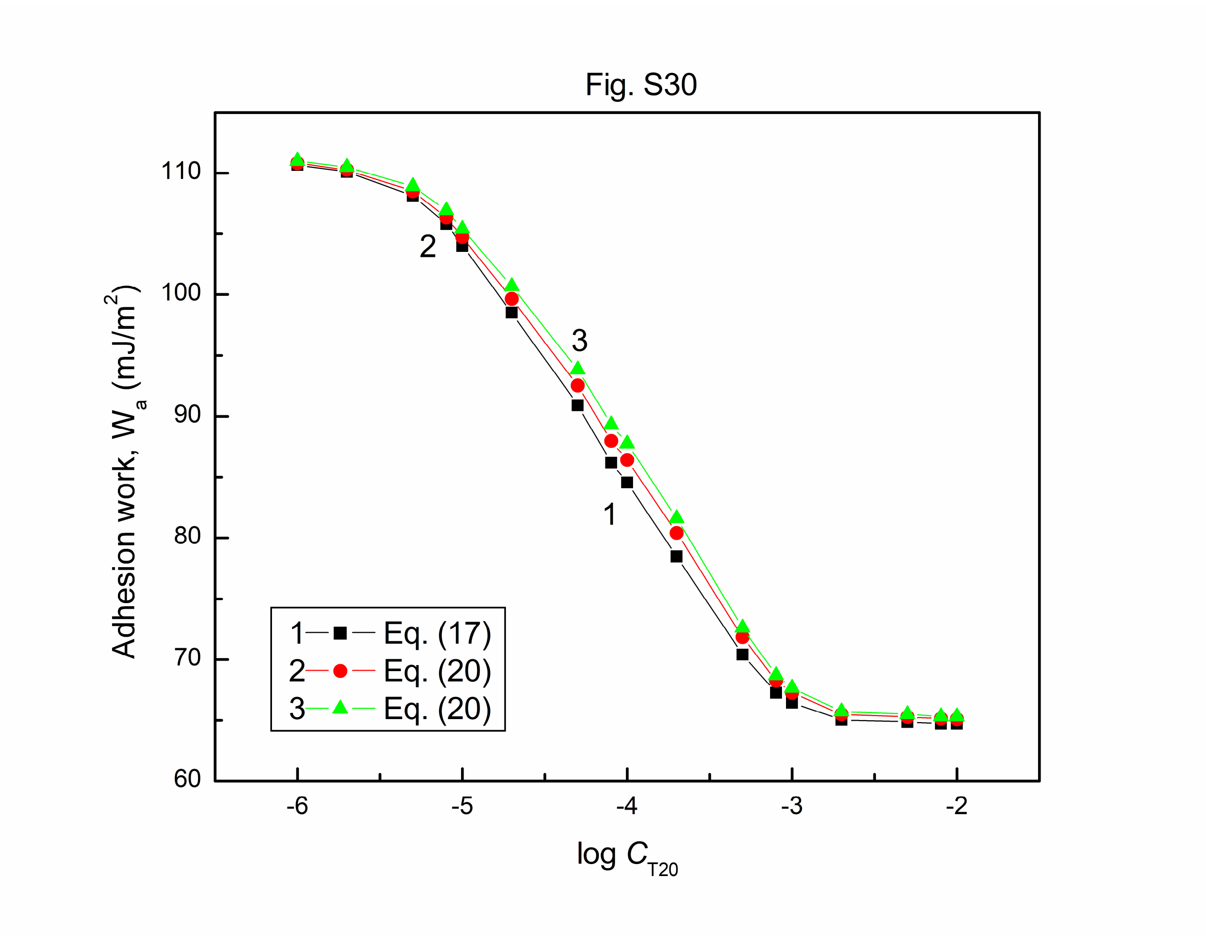


Fig. S30. The plot of adhesion work ($W_a$) of aqueous solutions of T20 to quartz calculated from Eqs. (17) (curve 1) and Eq. (20) (curves 2 and 3) vs. the logarithm of its concentration (log *C*). Curve 2 - for $\pi$ calculated on the basis of Eq. (7) (surface tension of solid from contact angle of water minus surface tension of solid from contact angle of solution), curve 3 - calculated for $\pi = \dfrac{\gamma_W - \gamma_L}{2}$.

Fig. S31

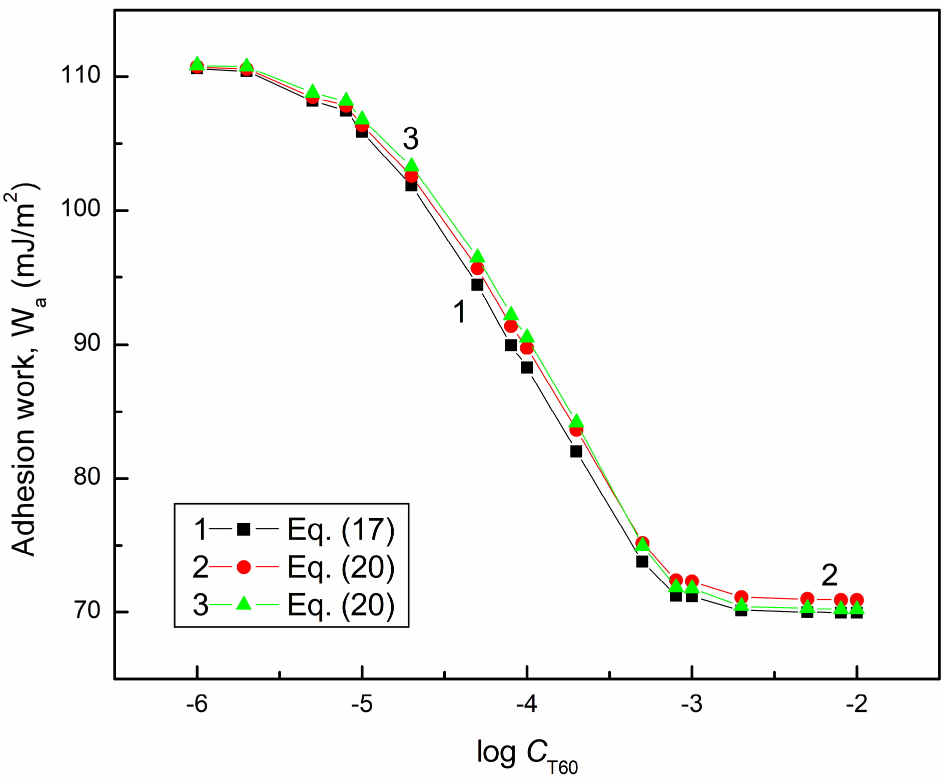


Fig. S31. The plot of adhesion work ($W_a$) of aqueous solutions of T60 to quartz calculated from Eqs. (17) (curve 1) and Eq. (20) (curves 2 and 3) vs. the logarithm of its concentration (log C). Curve 2 - for $\pi$ calculated on the basis of Eq. (7) (surface tension of solid from contact angle of water minus surface tension of solid from contact angle of solution), curve 3 - calculated for $\pi = \frac{\gamma_W - \gamma_L}{2}$.

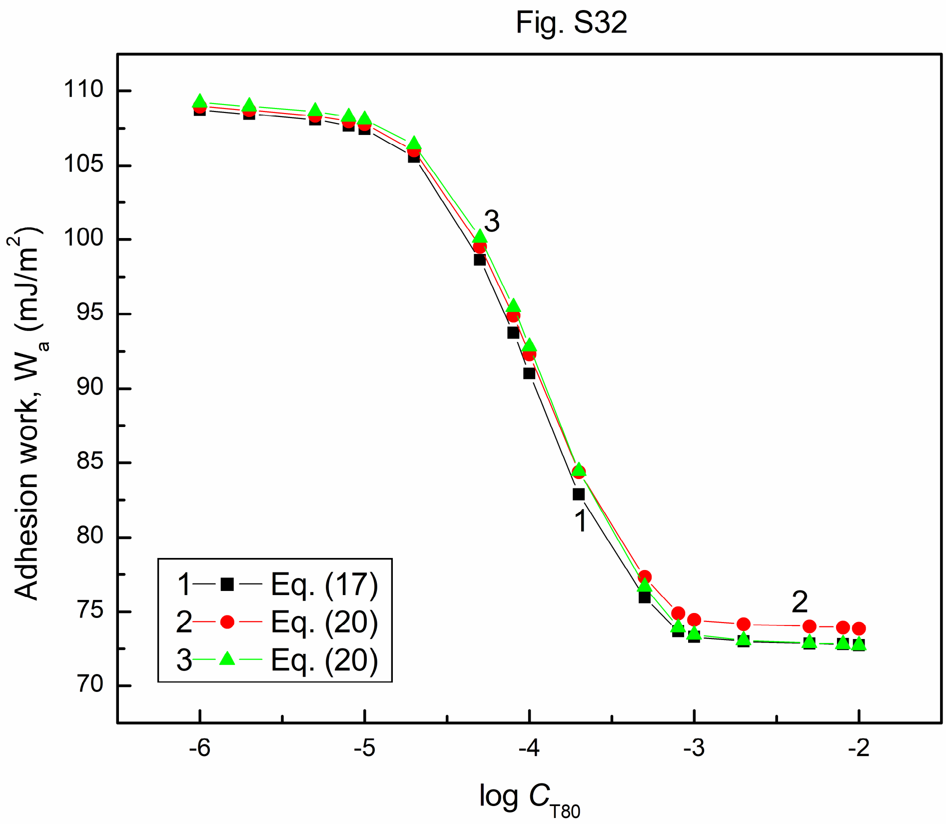


Fig. S32. The plot of adhesion work ($W_a$) of aqueous solutions of T80 to quartz calculated from Eqs. (17) (curve 1) and Eq. (20) (curves 2 and 3) vs. the logarithm of its concentration (log *C*). Curve 2 - for $\pi$ calculated on the basis of Eq. (7) (surface tension of solid from contact angle of water minus surface tension of solid from contact angle of solution), curve 3 - calculated for $\pi = \dfrac{\gamma_W - \gamma_L}{2}$.

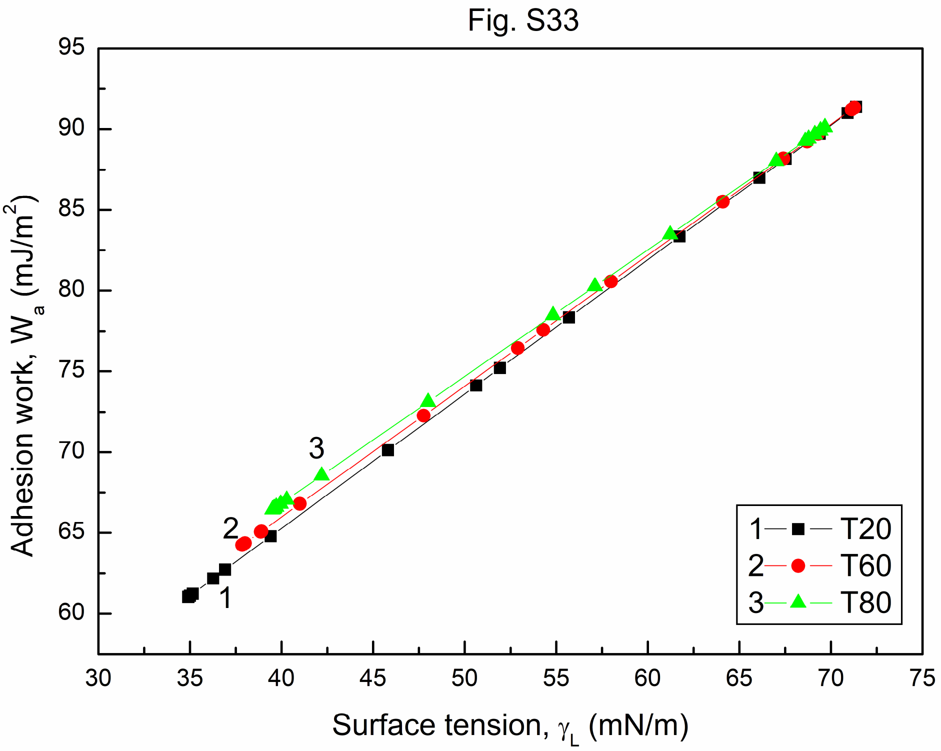


Fig. S33. The plot of adhesion work ($W_a$) of aqueous solutions of T20 (curve 1), T60 (curve 2) and T80 (curve 3) to PMMA calculated from Eq. (17) vs. the solutions surface tension ($\gamma_L$).

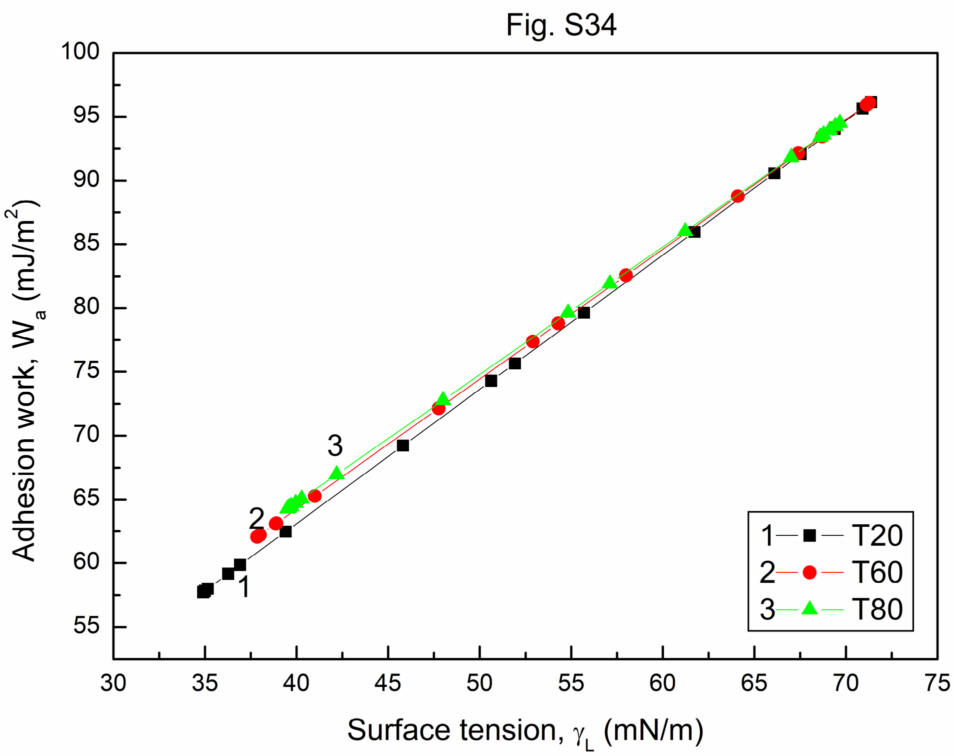


Fig. S34. The plot of adhesion work ($W_a$) of aqueous solutions of T20 (curve 1), T60 (curve 2) and T80 (curve 3) to nylon 6 calculated from Eq. (17) vs. the solutions surface tension ($\gamma_L$).

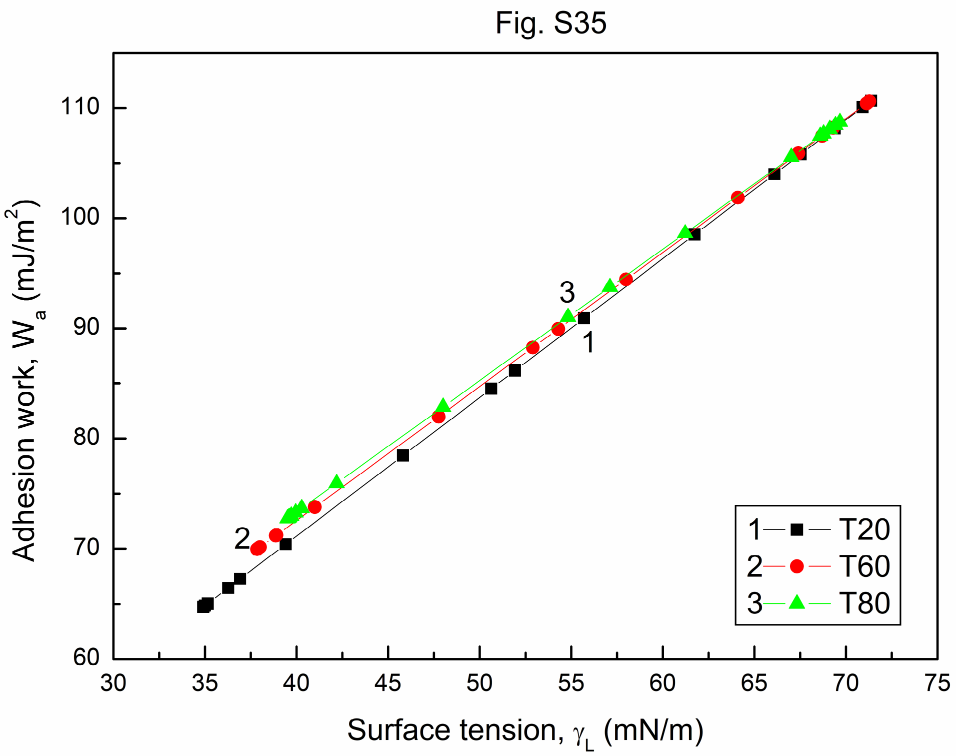


Fig. S35. The plot of adhesion work ($W_a$) of aqueous solutions of T20 (curve 1), T60 (curve 2) and T80 (curve 3) to quartz calculated from Eq. (17) vs. the solutions surface tension ($\gamma_L$).