**Supporting information**

**Ellipsometry**

Fig. S1 shows the development of the thickness of the SF adsorbed layers ($\delta_{ad}$) at the air/water interface with the adsorption time ($t_{ad}$) obtained for different pH values by ellipsometry. It can be seen that $\delta_{ad}$ of the SF adsorbed layers at the air/water interface first increases rapidly within the initial 15 min, and then increases more slowly until reaching an equilibrium value within approximately 250 min. Moreover, $\delta_{ad}$ of the SF adsorbed layers increases with the SF concentration and increases with $t_{ad}$ more rapidly at high SF concentrations.
**Fig. S1** Development of the thickness of the SF adsorbed layers at the air/water interface with the adsorption time for different pH values: (a) pH=3; (b) pH=4; (c) pH=7.

**Interfacial dilatational rheology**

Fig. S2 presents the change of the loss factor of the SF adsorbed layers at the air/water interface with the frequency for different pH values. It can be found that the loss factor
that represents the ratio of the viscous and elastic part is $< 0.25$ for the adsorbed SF layers formed at different pH and $C_{SF}$, indicating that the interfacial SF films are more elastic than viscous at all pH levels.
**Fig. S2** Change of the loss factor of the SF adsorbed layers at the air/water interface with the frequency for different pH values: (a) pH=3; (b) pH=4; (c) pH=7.