

Supplementary Information

To define the physical state of a monolayer the **monolayer compressibility or two-dimensional compressibility** (β or C_s , equation 1) or its inverse (β^{-1} or C_s^{-1} , equation 2), which has been called **surface compressional modulus, compressibility modulus or elasticity modulus**, have been used.

$$C_s = -\frac{1}{A} \left(\frac{dA}{d\pi} \right)_T \quad (1)$$

$$C_s^{-1} = -A \left(\frac{d\pi}{dA} \right)_T \quad (2)$$

Values of C_s^{-1} for different film states has been reported in the bibliography, and summarized in Table S1.

Table S1: Values of C_s^{-1} for different film states.

Ref. 45		Ref. 44		Ref. 43	
Monolayer state	C_s^{-1} (mN·m ⁻¹)	Monolayer state	C_s^{-1} (mN·m ⁻¹)	Monolayer state	C_s^{-1} (mN·m ⁻¹)
		Gas	0–12.5		
Liquid expanded	12.5–50	Liquid expanded	12.5–50	Liquid expanded	12.5–50
				Liquid	50–100
Liquid condensed	100–250	Liquid condensed	100–250	Liquid condensed	100–250
Solid condensed	1000–2000	Solid	>250	Solid	>250

- [45] Davies, J.T.; Rideal, E.K. Chapter 5 - Properties of Monolayers. In *Interfacial Phenomena* (Second Edition), Davies, J.T., Rideal, E.K., 351 Eds.; Academic Press: 1961; pp. 217–281.
- [44] Vitovič, P.; Nikolelis, D.P.; Hianik, T. Study of calix[4]resorcinarene–dopamine complexation in mixed phospholipid monolayers formed at the air–water interface. *Biochimica et Biophysica Acta* 1758 (2006) 1852–186.
- [43] Krajewska, B.; Wydro, P.; Janczyk, A. Probing the Modes of Antibacterial Activity of Chitosan. Effects of pH and Molecular Weight on Chitosan Interactions with Membrane Lipids in Langmuir Films. [dx.doi.org/10.1021/bm2012295](https://doi.org/10.1021/bm2012295). *Biomacromolecules* 2011, 12, 4144–4152.
- [11] Hoda, K.; Nakahara, H.; Nakamura, S.; Nagadome, S.; Sugihara, G.; Yoshino, N.; Shibata, O. Langmuir monolayer properties of the fluorinated-hydrogenated hybrid amphiphiles with dipalmitoylphosphatidylcholine (DPPC). *Colloids Surf. B Biointerfaces* 2006, 47, 165–175.

It is seen that the first values of C_s^{-1} (in mN·m⁻¹) reported by Davies and Rideal [45] present gaps in between 50 and 100 and in between 250 and 1000, and no indication of the gas phase was done. Vitovic et al. [44] selected values for the gas phase, even this phase is rarely observed, but a gap remained in between 50 and 100. And Krajewska et al. [43] added a liquid state for this gap. Thus, the author proposal has been to unify the liquid expanded and liquid states in one that comprise the values in between 12.5 and 100. I understand that it is another variation but simplifies the distinction in between liquid expanded and liquid, which is not clear. Krajewska et al. [43] cited the reference [45] when they reported the C_s^{-1} values, but in reference [45] the liquid state was not reported. I have also to note that Vitovic et al. [44] reported a

reference for the values of C_s^{-1} , reference [11] in his work, but analysing this reference no information on the values of C_s^{-1} can be found, which means that it was a mistake in the citation.