# 1 Additional Structural Model of the Lipid Membrane

The bilayer model discussed in our report represents the most simple model that reproduces the measured data. A more complex model for example is to assume that the COC surface is coated with a monolayer supporting a bilayer. This monolayer supported bilayer or trilayer needs 4 slabs as a box model if the adjacent headgroups are treated as one box. The resulting fit to the measured data based on this model coincides with the reflectivity curve reasonably well. However, the fit results in unphysical parameters for the trilayer, such as an extremely low head-to-head distance of the lipid supported bilayer ($d_{hh} = 21$ Å, s. inset in Fig. 1 (b)). Since there is no reason to believe that a bilayer supported by a lipid monolayer should be distorted in such a strong way, this model was rejected. Additionally, a bilayer stacked onto a monolayer is unlikely to be stable against the large shear rates generated during the preparation process in our microfluidic chamber (s. Materials and Methods). Of course, this excludes the existence of higher order layer systems as well, especially since such supported oriented lipid lamellar systems have been found to be unstable in excess water.[1–4]

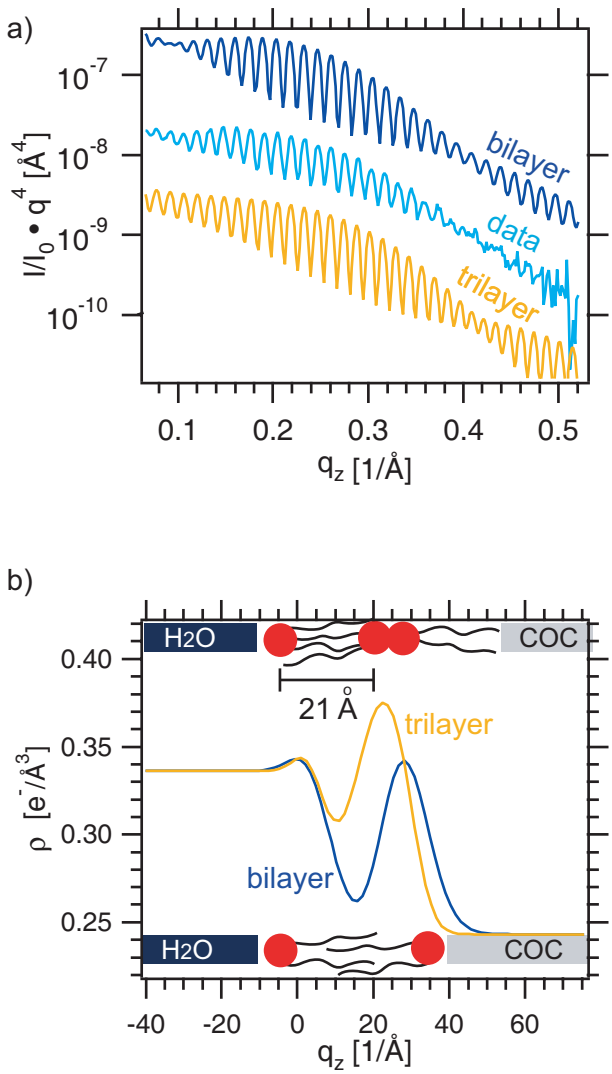


Figure 1: (a) The top curve features the best fit of the model assuming a bilayer divided by the Fresnel reflectivity $q^{-4}$ (dark blue solid line, "bilayer"). Stacked under it, the measured reflectivity curve (light blue solid line, "data") is displayed. The last curve represents the best fit of the model assuming a trilayer (orange solid line, "trilayer"). (b) The corresponding profiles are displayed (bilayer dark blue line, trilayer orange line). Schematic drawings illustrate the box models.

## References


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