

Supplementary information

Film 1: Dynamics of curling

We record the dynamics of curling of a 2 cm × 2 cm strip of bilayer B. The strip is placed flat on the support (nailed carpet) and clamped with tape on one side. The rest of the bilayer is maintained flat thanks to a piece of steel. Immersion in water for 45 sec ensures complete soaking of the bilayer. The removal of the steel piece allow the bilayer to curl. It is filmed with a high speed camera at 100 frames per second. The total duration of this film is 5.93 sec.

Film 2: Dynamics of curling at very short time

We record the dynamics of curling of a 2 cm × 2 cm strip of bilayer B. The strip is placed flat on the support (nailed carpet) and clamped with tape on one side. The rest of the bilayer is maintained flat thanks to a piece of steel. Immersion in water for 45 sec ensures complete soaking of the bilayer. The removal of the steel piece allow the bilayer to curl. It was filmed with a high speed camera at 5000 frames per second. The total duration of this film is 133 ms.