Supporting Movie Captions

Supporting Movie 1:

Time-lapse movie of budded nanovesicle for solute concentration $\Phi_S = 0.025$ and poor solvent conditions, see red line ($\zeta = 25/40$) in the phase diagram of Figure S1. Each snapshot of the movie represents a cross-section through the vesicle at time t as shown in the upper left corner. The membrane neck of the nanovesicle closes repeatedly (snapshots at times $t = 2\,\mu$s, $7\,\mu$s, $13\,\mu$, $26\,\mu$s, $30\,\mu$s, $35\,\mu$s, $37\,\mu$s, and $42\,\mu$s) and reopens again between these closure events. The movie displays these recurrent shape changes for the time interval between time $t = 1\,\mu$s and $t = 47\,\mu$s. A time series containing additional snapshots of the same nanovesicle is shown in Figure 6, see also Figure 7 with the corresponding time evolution of the membrane neck for the extended time interval $0 \leq t \leq 90\,\mu$s

Supporting Movie 2:

Time-lapse movie of budded nanovesicle for solute concentration $\Phi_S = 0.026$ and the same poor solvent conditions ($\zeta = 25/40$) as in Movie 1, see phase diagram of Figure S1. Each snapshot of the movie represents a cross-section through the vesicle at time t as displayed in the upper left corner. For this solute concentration, the membrane neck first undergoes a few closure and subsequent reopening events between $t = 29.0\,\mu$s and $t = 33.8\,\mu$s, qualitatively similar to the recurrent shape changes in Movie 1, but the last closure event at $t = 33.8\,\mu$s then leads to fission of the neck and division of the nanovesicle into two daughter vesicles that adhere to each other by an intermediate layer of adsorbed solutes, see the last couple of snapshots between $t = 33.8\,\mu$s and $t = 34.2\,\mu$s. A time series containing additional snapshots of the same nanovesicle is shown in Figure 9; the time evolution of the membrane neck diameter and the solute-mediated contact area is displayed in Figures 10 and 11, respectively.