

## SUPPLEMENTAL MATERIAL

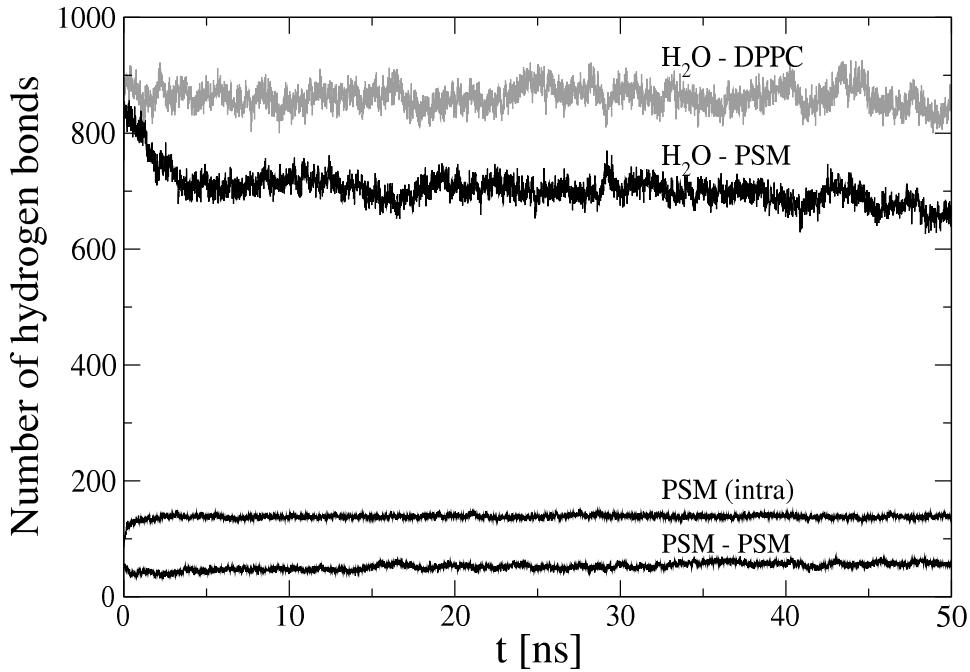


FIG. S-1 Number of different types of hydrogen bonds as a function of time.

TABLE S-I Intermolecular hydrogen bonds:  $\text{H}_2\text{O} \cdots \text{PSM}$ .

Bond	#N	%	$t_{1/2}$ [ns]
all	$711.5 \pm 21.1$	100.0	–
$\text{H}_2\text{O} \cdots \text{O}_{\text{P}_c}$	$238.3 \pm 7.8$	33.5	0.013
$\text{H}_2\text{O} \cdots \text{O}_{\text{P}_d}$	$233.8 \pm 8.0$	32.9	0.013
$\text{H}_2\text{O} \cdots \text{O}_{\text{P}_b}$	$64.6 \pm 6.2$	9.1	0.009
$\text{H}_2\text{O} \cdots \text{H}_{\text{NH}}$	$57.7 \pm 5.4$	8.1	0.185
$\text{H}_2\text{O} \cdots \text{O}_{\text{OH}}$	$55.4 \pm 6.3$	7.8	0.010
$\text{H}_2\text{O} \cdots \text{O}_{\text{PA}}$	$37.9 \pm 5.5$	5.3	0.009
$\text{H}_2\text{O} \cdots \text{H}_{\text{OH}}$	$1.4 \pm 1.1$	0.2	0.008

TABLE S-II Intermolecular hydrogen bonds:  $\text{H}_2\text{O} \cdots \text{DPPC}$ .

Bond	#N	%	$t_{1/2}$ [ns]
all	$862.8 \pm 19.8$	100.0	—
$\text{H}_2\text{O} \cdots \text{O}_{\text{P}_d}$	$218.4 \pm 7.6$	25.3	0.009
$\text{H}_2\text{O} \cdots \text{O}_{\text{P}_c}$	$217.8 \pm 7.4$	25.2	0.009
$\text{H}_2\text{O} \cdots \text{O}_{\beta 2}$	$207.2 \pm 7.8$	24.0	0.020
$\text{H}_2\text{O} \cdots \text{O}_{\beta 1}$	$82.5 \pm 7.4$	9.6	0.010
$\text{H}_2\text{O} \cdots \text{O}_{\text{P}_b}$	$65.7 \pm 6.3$	7.6	0.007
$\text{H}_2\text{O} \cdots \text{O}_{\alpha 2}$	$31.5 \pm 5.4$	3.6	0.009
$\text{H}_2\text{O} \cdots \text{O}_{\text{P}_a}$	$26.1 \pm 4.6$	3.0	0.006
$\text{H}_2\text{O} \cdots \text{O}_{\alpha 1}$	$13.7 \pm 3.6$	1.6	0.007