42. We need nine labels:

Label I for 8 molecules on side 1	and	0 on the side 2
Label II for 7 molecules on side 1	and	1 on the side 2
Label III for 6 molecules on side 1	and	2 on the side 2
Label IV for 5 molecules on side 1	and	3 on the side 2
Label V for 4 molecules on side 1	and	4 on the side 2
Label VI for 3 molecules on side 1	and	5 on the side 2
Label VII for 2 molecules on side 1	and	6 on the side 2
Label VIII for 1 molecules on side 1	and	7 on the side 2
Label IX for 0 molecules on side 1	and	8 on the side 2

The multiplicity W is computing using Eq. 21-18. For example, the multiplicity for label IV is

$$W = \frac{8!}{(5!)(3!)} = \frac{40320}{(120)(6)} = 56$$

and the corresponding entropy is (using Eq. 21-19)

$$S = k \ln W = \left(1.38 \times 10^{-23}\,\text{J/K}\right) \ln(56) = 5.6 \times 10^{-23}\ \text{J/K} .$$

In this way, we generate the following table:

Label	W	S
I	1	0
II	8	2.9×10^{-23} J/K
III	28	4.6×10^{-23} J/K
IV	56	5.6×10^{-23} J/K
V	70	5.9×10^{-23} J/K
VI	56	5.6×10^{-23} J/K
VII	28	4.6×10^{-23} J/K
VIII	8	2.9×10^{-23} J/K
IX	1	0