

Osmosis consumes and produces water? Simple experiment to test it

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Very simple experiment to test the hypothesis that osmosis works by consuming and producing water. In the hyperosmotic compartment, leave air, and seal the container. The movement of water should stop once the O₂ available in the compartment is used up. This should be enough to test the hypothesis.

If the hypothesis is correct, and easily observed in such a simple and standard experiment, why has no one noticed that osmosis does not work without access to external atmospheric O₂? People have missed things before, historically, neglected anomalies, failed to communicate them and to pay attention to them. People are very busy.

Overview of the experiment

Air contains roughly 0.01 mol oxygen gas per liter. This will turn into 0.02 mol water (0.4 ml) per liter air in the compartment. There is also 0.001 mol per liter oxygen gas dissolved in the water in the compartment, it will turn into 0.002 mol water (0.04 ml) per liter water in the compartment. The volume increase of water should be negligible, 0.4 ml per liter air and 0.04 ml per liter water, calculated from that water contains 55.5 mol per liter. The remaining air will be nearly pure nitrogen gas, assumed inert in the experiment. The air pressure will decrease with roughly 1/5th (the 21% O₂ consumed.) The reduced air pressure impairs the surface phase of water at the membrane, an effect similar to increased osmolarity. This should not have a negative impact on the experiment.

If the hypothesis is correct, then the movement of water should stop early in this experiment, compared to when using non-sealed compartment that has free access to external O₂ from the atmosphere.

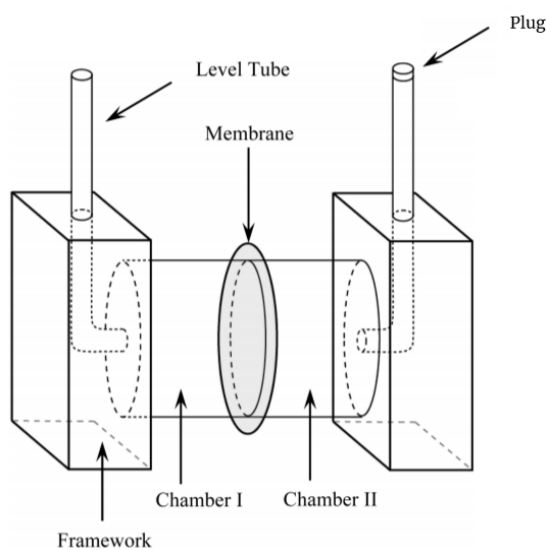


Figure 1. Experimental chamber. Drawing not to scale.