

Floating Razor Blade

Equipment:

large crystallizing dish, beaker or the like
razor blade (or paper clip)
tweezers
Pasteur pipette with small rubber bulb
if necessary filter paper or kitchen paper
small beaker

Chemicals:

tap water
dishwashing liquid

Safety:

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Procedure and Observation:

The crystallizing dish is filled with water. Subsequently, the razor blade (or paper clip) is very carefully laid upon the water surface using the tweezers. If this does not work, a piece of filter paper or kitchen paper of the approximate size of the razor blade is cut out, the razor blade is placed on it and the ensemble is cautiously laid upon the water surface. The paper quickly absorbs water, sinks to the bottom and can be removed with the tweezers. The razor blade floats calmly on the water surface. However, a closer look reveals that the blade has sunk a little bit (comparable to a weight on a stretched elastic membrane). Subsequently, a little bit of dishwashing liquid is filled into the beaker. A drop of dishwashing liquid is then added by means of the pipette near the razor blade to the water. The blade is first pushed slightly to the side, but finally it sinks to the bottom of the container.

Explanation:

The razor blade initially floats on the water due to its quite high surface tension, which is a consequence of the strong hydrogen bonds between the water molecules. When dishwashing liquid is added, the surfactant molecules contained in the solution slip between the water molecules and the hydrophobic residue of these molecules then extends out of the water. As a result, the attraction between the water molecules due to the hydrogen bonds decreases along with surface tension; consequently, the razor blade can no longer be supported by the surface tension and sinks to the bottom.

Disposal:

The liquid can be disposed of by flushing it down the drain.

