

Re: Increase surface tension of water

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- *From:* "tadchem" <tadchem@xxxxxxxxxxxx>
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Joachim Pimiskern wrote:

<randomname12345@xxxxxxxx> schrieb:

I building a project that requires a liquid to be dripped at the fastest possible rate. Right now I'm using water coming out of a little tube, this works pretty well but I'd like to get the most drops possible per second. When I increase the flow rate, the water will collapse into a stream.

Maybe you should make the tube opening triangular.

Some articles on droplet physics:

<http://www.newscientist.com/article.ns?id=dn4397>

<http://physicsweb.org/articles/news/7/11/8>

<http://www.physorg.com/news9547.html>

<http://focus.aps.org/story/v11/st14>

<http://www.aip.org/pnu/2005/split/745-2.html>

<http://www.physorg.com/news75478692.html>

<http://www.physorg.com/news6312.html>

<http://www.physorg.com/news8718.html>

<http://physicsweb.org/articles/news/8/9/3/1>

<http://physicsweb.org/articles/news/9/7/14/1>

<http://physicsweb.org/articles/news/10/4/4/1>

<http://physicsweb.org/articles/news/9/3/14/1>

Nice idea. I had not heard of this one before, but you have done your homework well.

Another phenomenon I have noticed is that when the liquid *fails* to 'wet' (adhere through surface tension) to the material of the orifice (as aqueous solutions adhere to the tip of a buret), the drops are significantly smaller. For this reason I used to coat the tip of my buret lightly with silicone grease (keeping the orifice itself clear) to insure smaller drops for those titrations with very sharp end points.

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I can't answer to the relative repeatability of the smaller drops or to the flow rate, but the smaller drops made for a finer resolution in the measurements.

I can also add that, at least in the viscous flow regime, the flow rate varies quadratically with the pressure drop through the orifice (within reason, of course). Elementary fluid mechanics texts (often found in the hands of chemical engineers) can provide more explicit equations.

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