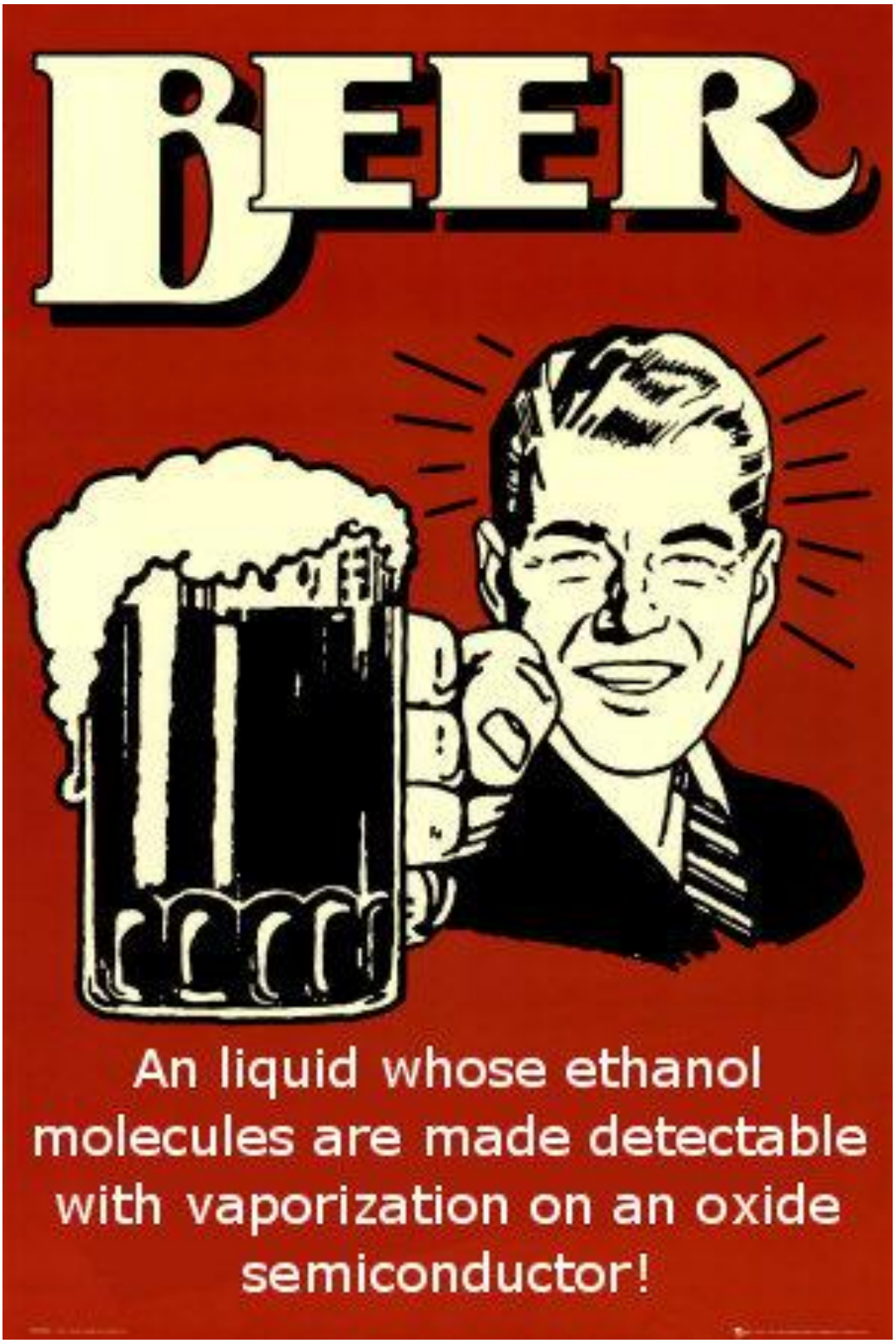


[User Manual for Kara's Breathalyzer]

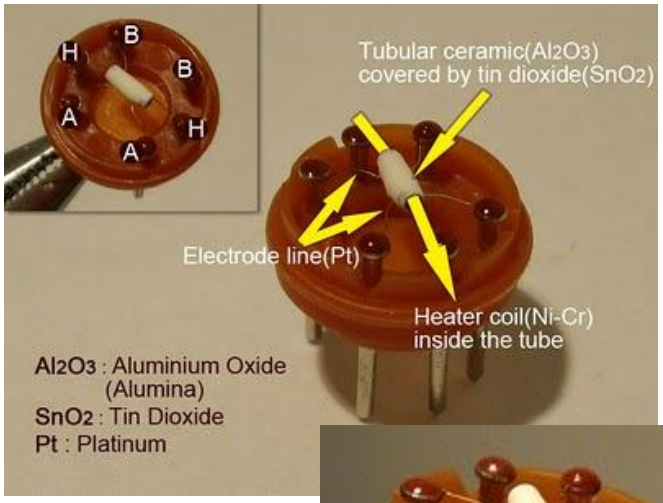
Instructions for Breathalyzer V.1:

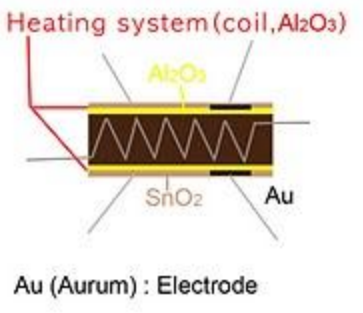
Basic Use:

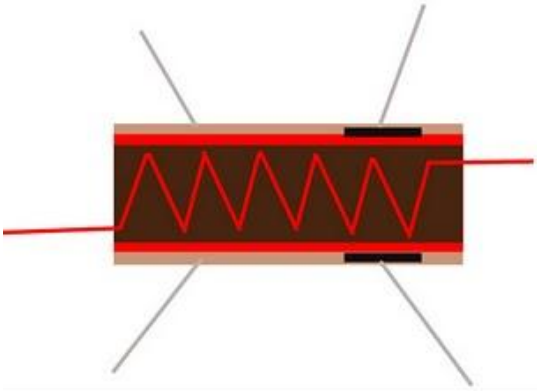
To turn the device on, flip the large switch to "on". The sensor needs about a minute to warm up, so just wait for the raw value on the screen to stabilize. To take a reading, blow warm air ("hhhaaaaa") on the orange sensor on the side. You don't need to blow for long, only about a second or so. The screen will display the raw value that the sensor is reading (0 to 1023) and give you a bar graph of the level of intoxication as well as some text saying whether you're drunk or not. I didn't have enough time to do full battery life testing, so I'm not sure how long it'll last. To charge it, flip the power switch of Off/Charge and plug in a USB cable. Again, I don't have testing to support this, but according to my math, it should take about 3 hours to charge fully. Ignore the small button on the top, it is for a future feature.

Accuracy:

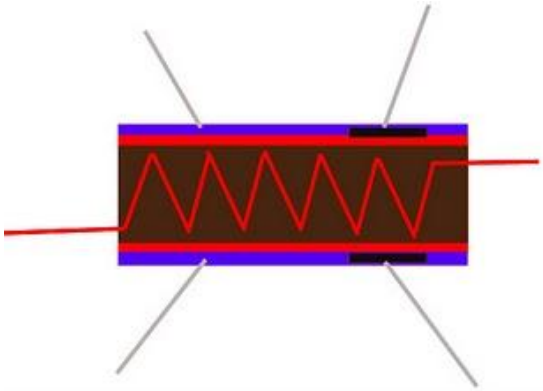
The sensor in this breathalyzer is not the same as the ones used in police breathalyzers. They use something called a Platinum Fuel Cell. They are very expensive and require frequent calibration by exposure to a known concentration of ethanol vapor. The police department has technicians that do this to maintain them. The sensor in your breathalyzer works by vaporizing the ethanol from your breath into acetic acid, which changes the resistance of a semiconductor.



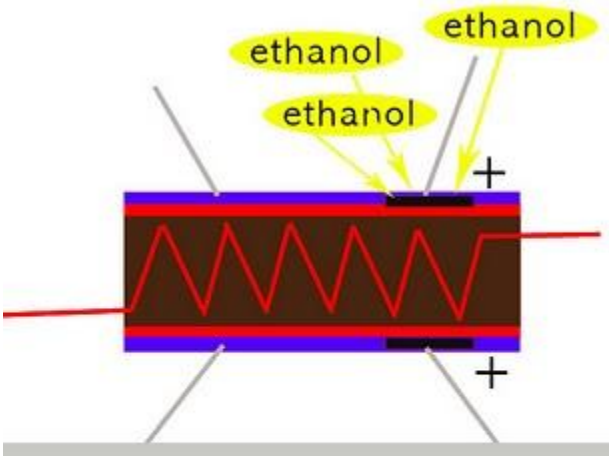




If coil is heated,



SnO2 ceramic becomes a semiconductor.

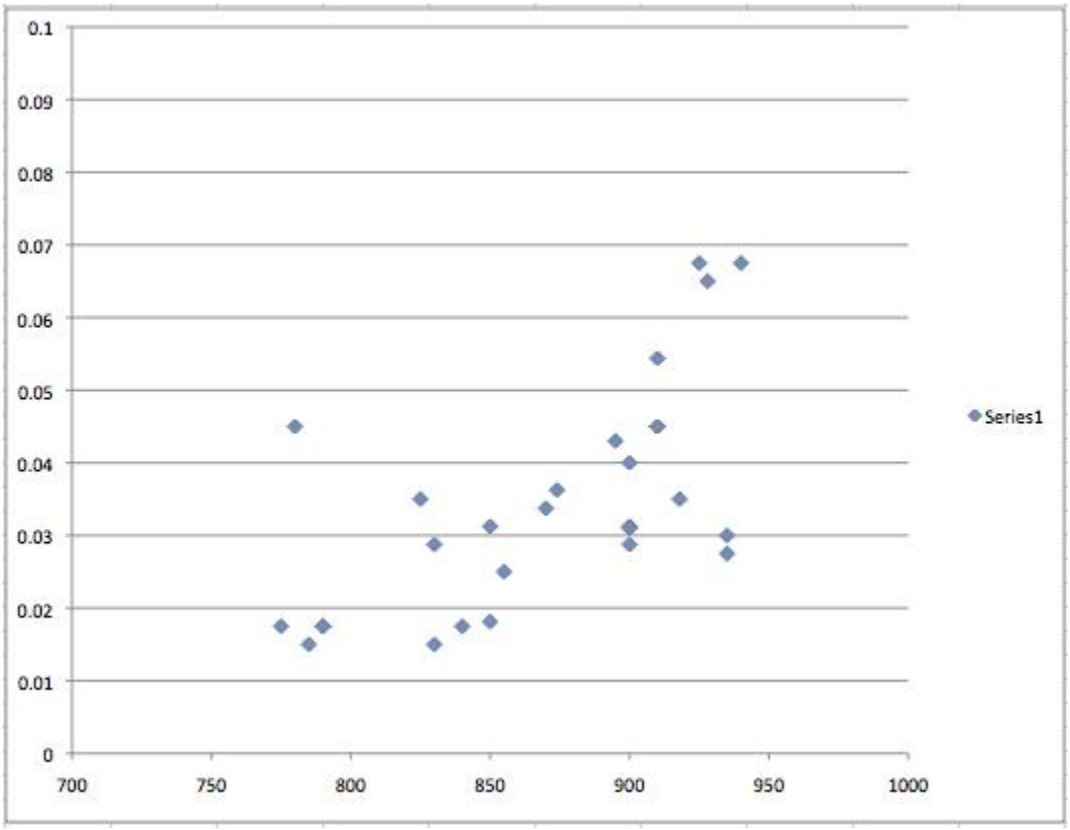


When alcohol hits the electrode, it is "burned" into acetic acid, which allows more current through the sensor.

What all that means:

You need to wait about 30 seconds in between tests. So if you do it, and then a friend does it right after that, her results will be less accurate. You also need to give it a few seconds once the device turns on to heat up. Since the sensor gets hot, don't put your lips directly on it or you'll get burned. As long as you hold it about 3-4 inches from your mouth, and don't try to French kiss it, you'll be fine. It is VERY important to understand that this device is mainly meant for fun. Do NOT try to use it to see if you can drive. If you've been drinking at ALL, then the answer is no. This breathalyzer is mainly to tell you if you are not drunk, sorta drunk, or very drunk.

Here's a plot of the raw sensor value vs actual BAC. You can use this to roughly estimate BAC. Sensor value is the X axis and BAC is the y axis. Note that it's not super linear. I didn't display the estimated BAC on the screen because I think to get it reasonable accurate, I'll need to calibrate it with you. See the "Other" section below for more on that.



Other:

The cool thing about having a friend who is a computer engineer is that you can get this thing custom calibrated to you. Right now it's the best I can do without having you here. There's also a few other upgrades that I didn't have time to implement like a backlight and a few battery saving things. So I can do that over Christmas too if you want.

Things to not do

There are several things you shouldn't do.

1) Don't get it wet. That includes splashing and full immersion.
2) Don't get your mouth or lips too close to the sensor. It's hot.
3) If the bottom of the case gets hot, that's bad. It's dangerous if it gets really hot because that means the battery failed. There is a lot of built in protection circuitry that will keep that from happening, so you pretty much need to puncture or crush the battery for it to fail and the only way to do that without taking the thing apart is to probably back over it with a car or train.
4) Don't try to take it apart unless I am walking you through it for some reason. The only thing holding it all together is those four screws on the top, so leave them alone.
5) Try not to drop it. There's no protection over the screen, so it might crack.
6) Don't flip the power/charging switch on and off really fast. I don't really know what will happen if you do, but it can't be good.
7) **Basically, treat it like your phone or iPod and you'll be fine.**