



## How to Make a Hydrogen Fireball from Aluminum Foil and Toilet Bowl Cleaner

Balloons are fun, but the helium ones are always more entertaining. Learn how to make hydrogen gas by combining toilet bowl cleaner with aluminum foil. With hydrogen, you get the same lighter-than-air properties of helium, plus it will explode! Historically, this has proven disastrous, but for our tiny-scale experiments, it will be safe and fun! *Credit: William Finucane, Boston, <http://revoltlab.com/>*

### Materials

- "The Works" brand toilet bowl cleaner (20% hydrochloride)
- Aluminum foil
- Balloon
- Glass bottle
- Long match

### Procedure

**Step 1 Pour the Cleaner** - Pour 100 ml of the cleaner into your glass jar. You can afford to approximate, because the reaction size will be limited by the amount of aluminum we add later on.

**Step 2 Prepare Foil** - Cut a 4-inch square piece of tinfoil to put into the bottle. **Do not use a bigger piece, as it could cause the bottle to crack and the balloon to explode and throw burning liquid around the room.** Crumple the foil up so that it will fit through the neck of the glass bottle. Don't make a sheet any larger than 4 inches!

**Step 3 Get Safe-** Put on your safety goggles. Move the experiment to a place that you don't mind getting soaked in boiling liquid. Also, be sure to get your balloon ready and accessible for the next step.

**Step 4 Add the Foil and Cover the Bottle** -Push your crumpled aluminum foil into the bottle and immediately cover the top with your balloon. You have about 30 seconds before the reaction gets violent, so do this right away. Once the balloon is secure, stand back a few feet and watch the reaction.

**Step 5 Harvest Hydrogen-** Wait for the bottle to cool and remove the balloon from the top. Twisting it several times before removing it will help keep the gas inside while you tie the knot. Take your hydrogen gas outside and light it on fire with a long match. The gas will disperse and burn as the balloon pops, so don't use a lighter or a regular match. You will be too close to avoid getting burned.

**Please use caution when doing any science activity. Be careful not to get any of the solution in your eyes, and wash your hands after handling the solution.**

