



How Does Etching Work?

One of the main steps used in semiconductor manufacturing is **etching**. First, '**photolithography**' puts a pattern on the **chip**, and then the chip is etched. Etching is needed to create all of the structures on a chip, from the transistors to the many layers of metal lines.

In **wet etch**, the patterned chip is exposed to wet chemicals. Everything underneath the pattern is protected, and won't get etched. Everything that is not protected, will get etched away.

In the etching activity, we taped part of an antacid tablet and then etched it with vinegar. The tape was like a photolithography pattern. The exposed part of the tablet got etched, but the taped part was protected. Look closer at your etched tablet. Was the etch perfectly vertical, or did the vinegar etch a little bit of the tablet underneath the tape? We call this '**undercut**'. Once you took the tape off of the tablet, you probably realized that this type of etch isn't very precise.

There is another type of etching commonly used in making **semiconductors**, that solves this problem. **Dry etch** is done by bombarding the chip with a **plasma** of reactive gases. A plasma is an **ionized** gas, so we can direct it to etch vertically onto the wafer. That means that dry etch will give us very precise etched lines, which is needed when we want to make really small transistors!

