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## **Question:**

### ***How do you make Platinum Iridium STM tips?***

***Platinum Iridium (Pt-Ir) is preferred for use in air because platinum does not easily oxidize. The tiny fraction of Iridium in the alloy makes it much harder. A tip made with pure platinum would naturally become blunt in a short time, as the atoms on the end of the tip would flow around to minimize the surface.***

***The Pt-Ir tips are usually shaped by cutting Pt-Ir wire with a wire cutter. The standard technique uses a wire cutter (diagonal cutters) and a pair of pliers. Grab the wire with the pliers hold the cutters at an acute angle to the wire and as you start to cut into the wire pull with the pliers. Ideally as you start cutting through the wire it will weaken and break at the end of the point. The idea here is that because the wire broke apart the tip was never touched by the cutters, avoiding possible contamination of the tip.***

***You don't have to use Pt Ir wire. I have also made tips with copper wire that have achieved "atomic" resolution on graphite, and independently others have done the same on commercial machines. Copper tips don't last as long and at higher bias voltages they can quickly oxidize in the surface water contamination. It is not the best for the long term but it is cheap and easy.***

***Tungsten wire is often used for STM tips. Tungsten (W) is very hard and it is easy to electro-chemically etch to a fine point. One drawback Tungsten slowly oxidizes in air. Tungsten can be electro-chemically etched in KOH or NaOH solutions. I have attempted to use a drain cleaner that is mostly NaOH to electro-chemically etch tips but with only marginal success.***

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