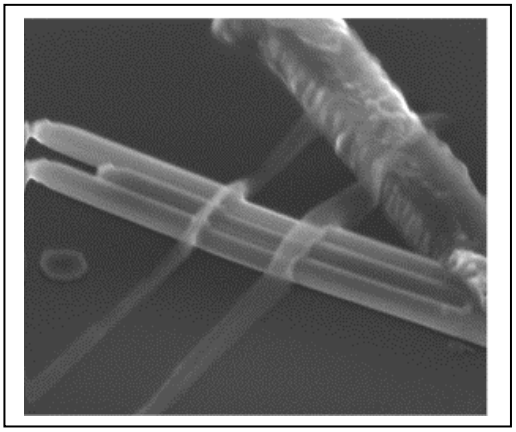
Chris Mkolongo

A novel way to improve contact quality to nanowires.

All modern technology is based on our ability to manipulate electricity and the ways we transport it to different places. For this, we must have good contacts among wires for more effective and efficient transportation of electric power. A good contact of wires becomes even more important when we go to very small scales such as nanometers which is a billionth of a meter. For comparison, an average human hair is about 60,000 nanometers thick. Wires that are on this very small scale are known as nanowires. Nanowires are made from semiconductors, which are a type of material with properties of both metals and insulators depending on the local temperature of the surrounding environment. These wires are usually grown in special conditions in the laboratory. Due to the nature of semiconductors, an unwanted layer is formed on the outer surface when in contact with air, making nanowires less conductive. Getting rid of this unwanted layer is one of the daunting tasks since the thickness of this layer is enormously small and so are the nanowires.

There has been a lot of research and developed methods employed already in the nanotechnology industry to remove unwanted layers from nanowires. The most employed method is the use of chemical reagents that react with the outer layer leaving behind a relatively cleaner nanowire. This method is sometimes referred to as the wet etching process since it involves the use of chemical reagents that are in a liquid state. The newly developed method that is still in the research phase involves the use of plasma. Ions from the plasma are extracted and accelerated towards the nanowires and directly remove the unwanted layer. This is more like scraping dirt on a bench by shooting bullets at an angle. As you can imagine, this is a very powerful process compared to using wet chemicals. It also means that things can turn the other way if not careful. We must find the right amount of power we want to shoot the ions otherwise we risk destroying the entire nanowire, also the angle and position at which we must fire our ions play an important role in the result. There are even more parameters that can be varied during the entire process of removing the unwanted layer, and all these must be understood in detail before this promising process can be of use.

Scientists are still working on this topic in the hope of revolutionizing the way nanowire-based devices are processed. The result that will be obtained from this project will contribute to the nanotechnology industry and science community in general.



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