**Semiconductors**
**Andrew Tanuwijaya - 2602158216**

Semiconductors, in the simplest form, is a conductor that has a conductivity level between an actual conductor (or an object that allows heat, sound, or electricity to pass through), and an insulator (which does not allow the aforementioned subjects to go through). The reason they are not full conductors is due to the introduction of different alloys into the material. Silicone is the most common material, as it is not only cheap but rather effective. While it may seem slightly complicated, rest assured, the nature of these strange devices will be revealed.

There are many reasons as to why one would use a semiconductor, but none are known to the general public. As a matter of fact, chances are that not many would even know what a semiconductor is, or what it does. Fair enough, to be fair. Why are we even using semiconductors? After all, a normal conductor should be more than enough to do the job of electrical conduction. Well, that statement is unfortunately false. The uses of semiconductors are incredibly high, much more than most would expect. Semiconductors are used to manipulate the flow of conduction. Normal conductors allow constant flow, they continuously allow the electricity, or whatever is being conducted, to run. That fact is amazing, and should be enough. However, change it up a bit, and try to control the conduction instead. The conductor cannot handle the job, as it keeps conducting. A semiconductor, on the other hand, fits the bill quite well, as it can be altered to alter the conduction.

Why are semiconductors important? Well, name any electronic device, and there is a high chance it uses a semiconductor. Computers, for example, use semiconductors. Smartphones, of course, use semiconductors. Televisions, radios, and most modern gadgets will use them. Commonly used in computer chips, they help regulate the flow of conduction within the device. Take a lamp. With a conductor, we would have that light on 24/7, as there would be no means of switching it off. However, when we input a semiconductor, the lights can finally go dark.

Let's take a closer and more important example, a smartphone. What do semiconductors do in smartphones? Unfortunately, a little bit of A-Level Physics is required to go any further. In a circuit (which smartphones are made up of), there are two types of currents. There is the direct current, and there is the alternating current. Both are exactly what they sound like, the direct current is when the flow of charge is within a singular, direct line, whilst the alternating current is a current that would alternate its direction at set increments of time.

Why would we use either? The alternating current is more efficient when being transmitted, while the direct current is more efficient at its own job. Since the alternating current can be transmitted with less power loss, it is the type of current that our home electricity uses. However, our phone chargers do not use the same type. If we tried to use an alternating current for our phone, it would simply explode, due to the type of energy being input. A smartphone uses a battery, and so a direct current is what we need. Visualize a battery, with the positive side and the negative side. Thus, a rectifier, which contains a semiconductor, is used. Within the rectifier is a diode that only lets the current flow in one direction.

Well, that seems heavy, does it not? Hopefully, that will be the last difficult explanation. However, I hope the point is clear: the applications of semiconductors, while complex, are extremely important and incredibly varied. The next question is how it improves our life, and how will it pave the way for our future. As mentioned, it helps with many daily devices we use from day to day. The heavily explained example is for smartphones. Imagine the possibilities we could create with this technology. Computation is already advancing as we speak, in terms of speed, cost effectiveness, and power. Soon, computing speed will increase with the ease in accessibility for quantum computers. That, however, is still quite far in the future.

So, what about the contributions semiconductors made for the different industries, such as transportation, communication, and the healthcare industry? In terms of transportation, it has allowed us to enjoy a more comfortable ride from destination to destination, with the entertainment aspect such as air conditioning/touchscreens and the safety aspects such as the airbag having a more stable function. In communications, semiconductors allow for wireless conversations to be held from anywhere across the globe (as mentioned in electronics previously). Semiconductors revolutionized healthcare, as most medical devices plugged into a socket require the rectifiers previously explained. Anything that needs electricity provided from an outer source would usually have a semiconductor in it. Without it, heartbeat monitors, X-Rays, CAT scans, and many other healthcare instruments would not work at all.

Clean energy, on the other hand, requires its own paragraph. While yes, the previous statements are applicable, the usage of semiconductors in providing clean energy is a lot more interesting to get into. Solar panels are the most popular form of clean energy, and the way it works is surprisingly simplistic. Two semiconductors are used to separate the positive and negative particles in the sunlight, using their differing charges. Photons (commonly defined as a quantum of electromagnetic energy) in the light would transfer its energy to the negatively charged electrons, which would form a current of electricity, and then we have power. None of this would be possible without the two semiconductors.

In conclusion, semiconductors are heavily overlooked. While the average person would be unlikely to know what it is, the facts are there: semiconductors are one of the most important pieces of technology that has changed our world, and it will continue to do so as it helps us advance even further into the future.

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