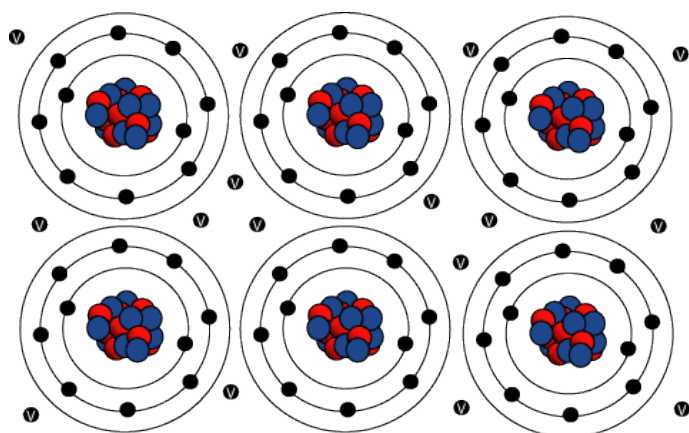


The main reason that copper is used in electrical wires is very simple. It is price. There are other things that can do a better job, but they are more expensive. Gold wire conducts electricity much more efficiently than copper, so does silver. At one time aluminum was more costly than gold because of the process to get it from the ore. It wasn't until electric smelting came into use (about 1900) that aluminum became cheaper than copper. Aluminum is a very very good conductor of electricity, but has one big flaw. When you put a little too much current through the wire, it stays stable until it reaches "too much"---then it goes off like a dynamite fuse. Copper, when the current is too high will soften, glow red, become soft, then finally melt. In some places aluminum is used for wiring, but is limited because of the fire danger. The diameter is larger than for copper.



Simply stated, most metals are good electrical conductors, most nonmetals are not. Metals such as copper typify conductors, while most non-metallic solids are said to be good insulators, having extremely high resistance to the flow of charge through them. "Conductor" implies that the outer electrons of the atoms are

loosely bound and free to move through the material. Most atoms hold on to their electrons tightly and are insulators. In copper, the valence electrons are essentially free and strongly repel each other.