Element	**Elect. Conductivity** [S/m]	**Elect. Conductivity** [% IACS]
Silver	$61.4 \cdot 10^6$	105.9
Copper	$\mathbf{59.1 \cdot 10^6}$	**101.9**
Aluminum	$36.6 \cdot 10^6$	63.1
Iron	$10.0 \cdot 10^6$	17.0
Lead	$4.7 \cdot 10^6$	8.1
Stainless Steel	$1.4 \cdot 10^6$	2.4
Graphite (parallel to layers)	$3 \cdot 10^6$	5.2
Titanium	$2.6 \cdot 10^6$	4.4

Table 2.2: Comparison of Electrical Conductivities of Elements

dard for 100 % conductivity in IACS-units[1]. Very pure copper exhibits with $59.1 \cdot 10^6$ S/m an even higher conductivity of 101.9 % IACS. As silver is too expensive and has only a 5% higher conductivity, copper is the most important metal, if electrical power has to be transported with the lowest losses.

The reason for the high conductivity of the metals is the capability of the outer electrons to move relatively free through the lattice in the crystal (see Figure 2.1.2). Whereas the positive ions of the metals are placed on fix positions in the crystal, the small electrons move like a gas. So the electrons form an "electron cloud". If a voltage is put between two positions on the metal the cloud moves leading to an electric current.

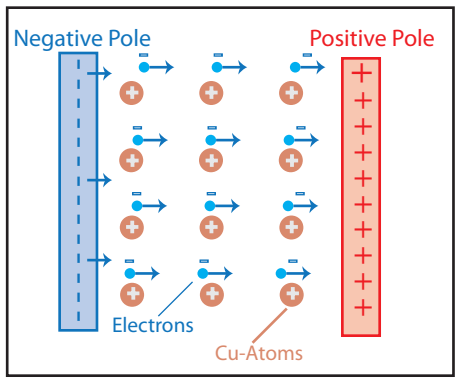

Figure 2.2.4: Mechanism of Electrical Conductivity of Copper

[1]International Annealed Copper Standard