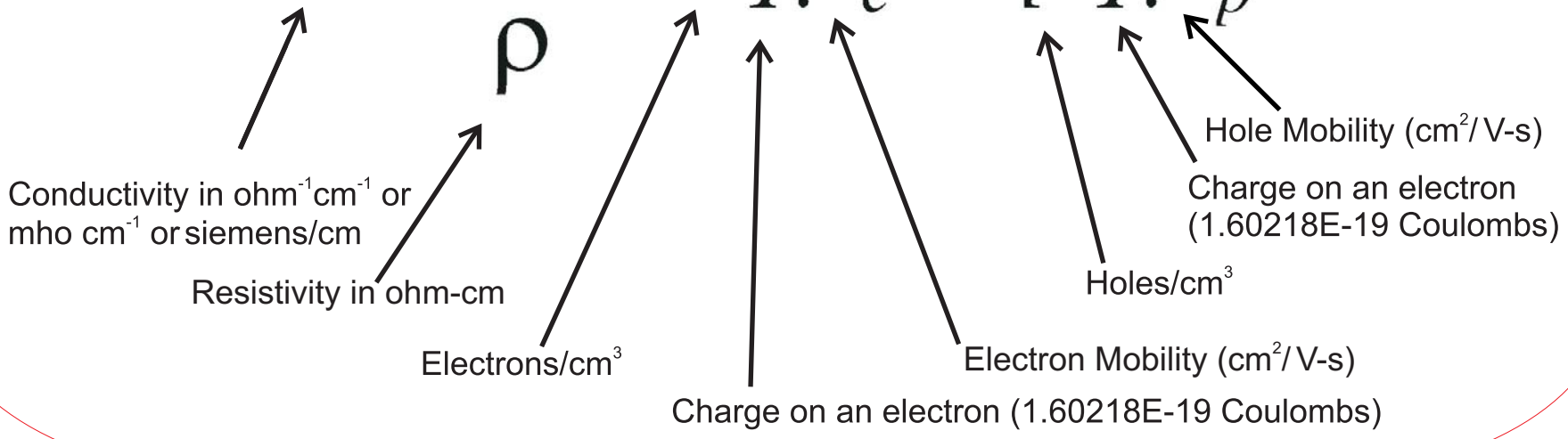
What is the significance of resistivity?

In a semiconductor, it is related to the concentration of electrons, holes, and their carrier mobilities. These are the things that make semiconductors work!

$$\sigma = \frac{1}{\rho} = nq\mu_e + pq\mu_p$$



Unless the resistivity is extremely high, majority carrier concentration will exceed minority carrier concentration by orders of magnitude so that only majority concentration and mobility need be considered.

$$\sigma = \frac{1}{\rho} = Nq\mu$$

Conductivity in $ohm^{-1}cm^{-1}$ or mho cm^{-1} or siemens/cm

Resistivity in ohm-cm

Majority carriers/cm^3

1.60218E-19 Coulombs

Majority Carrier Mobility (cm^2/ V-s)

So, except for the case of extremely high resistivity, the resistivity is dependent on the product of "only" two variables. Fortunately, for high quality, single crystal silicon, the mobility is usually well behaved

$$\sigma = \frac{1}{\rho} = Nq\mu$$

Conductivity in $ohm^{-1}cm^{-1}$ or mho cm^{-1} or siemens/cm

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Majority Carrier Mobility (cm^2/ V-s)