

# Example: Aluminum wire

Why household electrical wire is not aluminum:

Aluminum is cheap and a good conductor. However, aluminum tends to form an oxide surface layer ( $\text{Al}_2\text{O}_3$ ) which can be as much as **several nanometers thick**.

This layer could cause a problem in making electrical contacts, since it presents a barrier roughly **10 eV high** to the flow of electrons in and out of the Al.

Your requirement is that your transmission coefficient across any contact must be  $T > 10^{-10}$ , or else the resistance will be too high for the high currents you're using, causing a fire risk. Should you use aluminum wiring or not? (You can neglect  $G$  here.)

