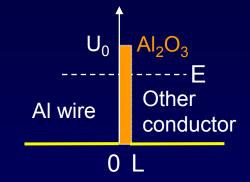
Example: Aluminum wire

Why household electrical wire is not aluminum:

Aluminum is cheap and a good conductor. However, aluminum tends to form an oxide surface layer (Al₂O₃) 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.)