Supplemental document

Modulation Acceptor Doping of Silicon Nanowires
using a SiO_2-shell doped with ALD Metal Oxide Monolayers

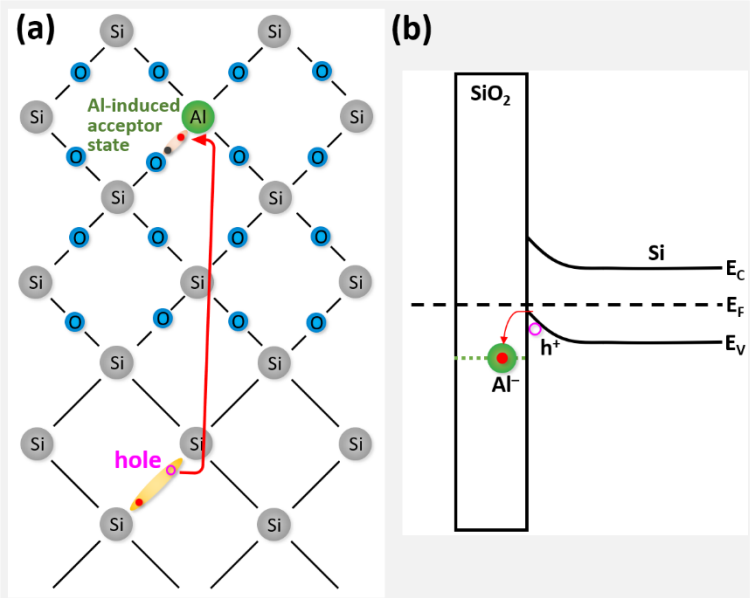

Figure 1. (a) Principle of SiO_2 modulation doping using Al-induced acceptor states. The red arrow indicates the tunneling of an electron from Si into the unoccupied acceptor state, which creates a free hole as majority carrier (colored magenta). (b) Band structure scheme showing the energy levels involved in the modulation doping process.

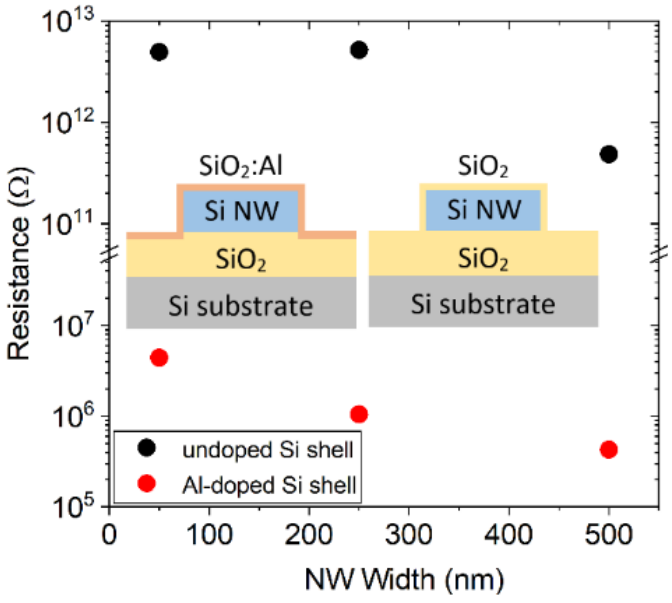

Figure 2. Schematic cross-sections of the Si NW test devices (left: SiO_2:Al shell for modulation doping; right: undoped, intrinsic SiO_2-shell) and electrical resistance results demonstrating the significantly improved conductivity.