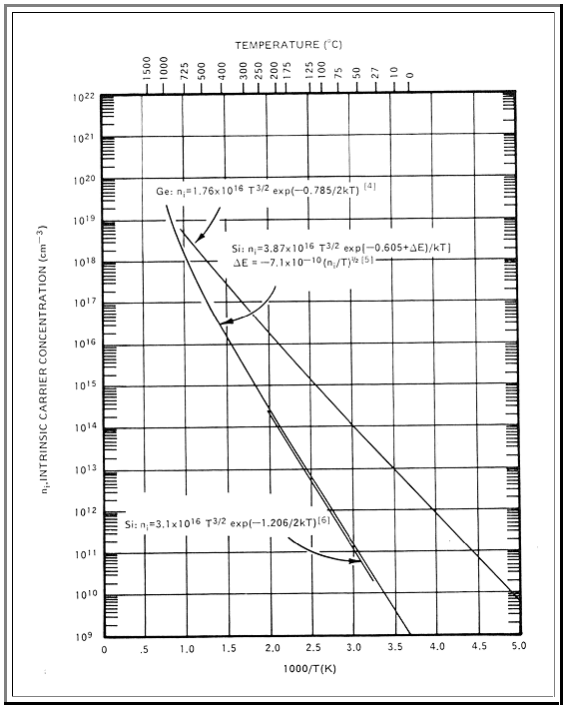
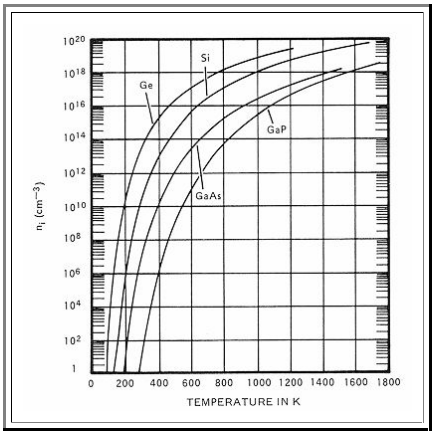
Doping and Mobility

Illustration

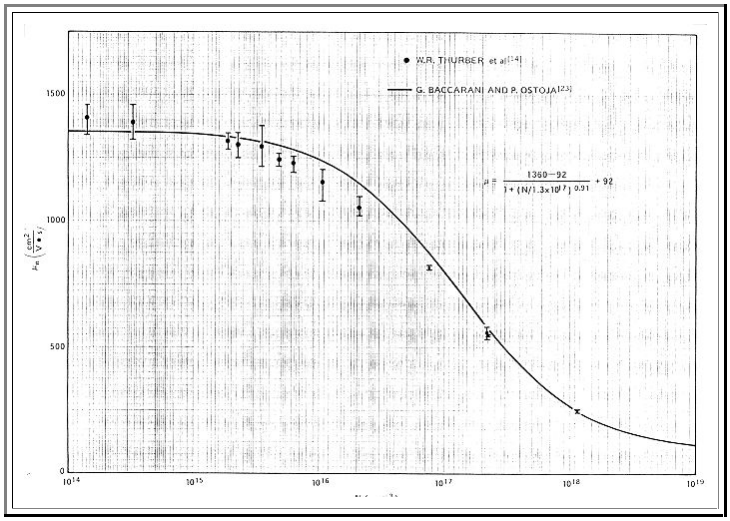
- Shown are some standard diagrams *(without detailed comment at present)*
  - The first graph gives an **Arrhenius representation** or Arrhenius plot of the *intrinisc carrier concentration* in **Si** and **Ge** for various approximations. The (small) effect of the $T^{3/2}$ factor can be seen for **Ge**; it is reponsible for the bending of the rather straight line at high temperatures.



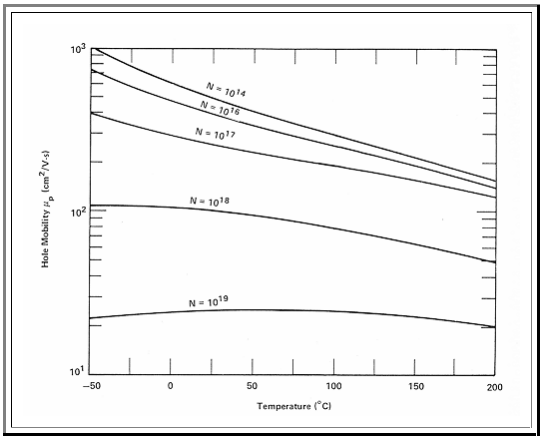
- The next plot shows the *intrinsic carrier concentration of several semiconductors* as a direct function of the temperature. Note that at room temperature there is a difference of about **7** orders of magnitude.



- This plot shows the dependance of the *mobility on doping*



Here is the dependance of the *mobility on temperature* in the interesting ***T***-range for Si



This is the combined result of carrier concentration and mobility: The *resisitivity of Si* as a function of doping for electrons and holes separately.