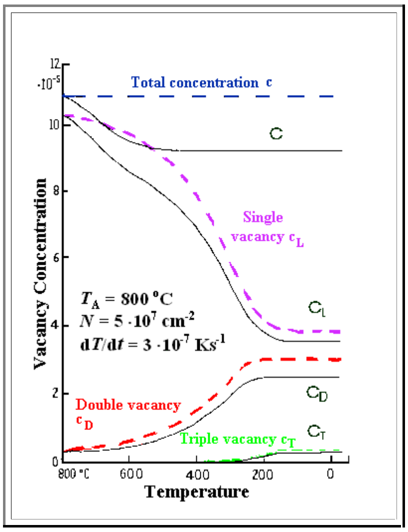
Calculated Vacancy Concentration After Quenching

Illustration

- Calculated changes in the concentration of single- double- and triple vacancies (c_L, c_D and c_T) and the total concentration $c = c_L + 2c_D{}^0 + 3c_T$ in **Au** during quenching from **800 °C** with **d*T*/d*t* = 3 · 10⁴ K/s** (after **Furuka**).
  - The colored dashed lines assume a dislocation density of zero (i.e. no sinks, ***N* = 0)**, whereas the solid lines assume a dislocation density of $N = 5 \cdot 10^7$.



  - Without sinks, the *total* concentration ***c*** of vacancies does not change is required (since no clusters with more that **3** vacancies are allowed). The concentration of single vacancies, however, changes considerably despite the large cooling rate.
  - The presence of sinks does change the picture somewhat, but not dramatically as we would expect for large cooling rates - there simply is not enough time to migrate to a sink.
  - For the migration energies ($E_{x,M}$) and the binding energies $E_{x;B}$ the following values were used: **$E_{L,M}$= 0.83 eV**, **$E_{D,M}$= 0.71 eV**, **$E_{D;B}$= 0.35 eV**, **$E_{T,B}$= 0.65 eV**.
  - See also chapter 10.2 in the "Physikalische Metallkunde" of **P. Haasen**