N – Ni (Nitrogen – Nickel)

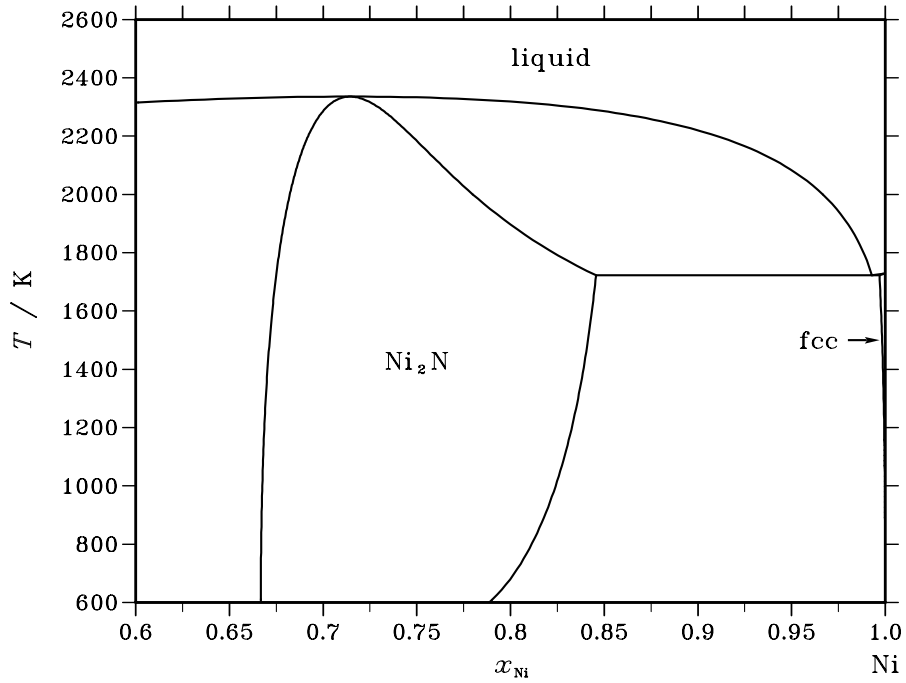

Fig. 1. Calculated phase diagram for the system N-Ni.

N and Ni are both alloying elements in steels and other alloys. There is very little solubility of N in Ni and no stable nitrides. Only at very high nitrogen activities metastable Ni_2N can be calculated which is shown in Fig. 1. The assessment has been reported in [91Fri].

Table I. Phases, structures and models.

Phase	Struktur-bericht	Prototype	Pearson symbol	Space group	SGTE name	Model
liquid					LIQUID	$(N,Ni)_1$
Ni_2N	...	...	$hP*$	$P6_322$	HCP_A3	$Ni_2(N,\Box)_1$
fcc	$A1$	Cu	$cF4$	$Fm\overline{3}m$	FCC_A1	$Ni_1(N,\Box)_1$

Table II. Invariant reactions.

Reaction	Type	T / K	Compositions / x_{Ni}			$\Delta_r H$ / (J/mol)
liquid $\rightleftharpoons$ Ni_2N	congruent	2335.5	0.714	0.714		−36320
liquid $\rightleftharpoons$ Ni_2N + fcc	eutectic	1722.6	0.993	0.846	0.997	−17584

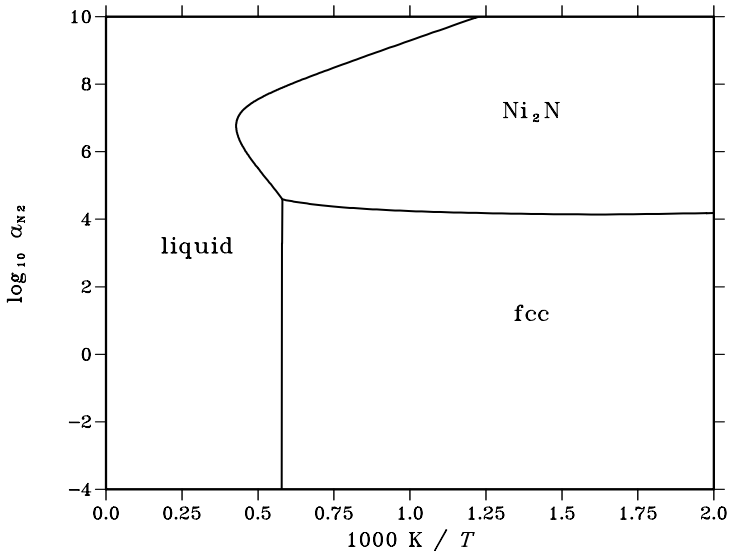

Fig. 2. Calculated temperature-activity phase diagram. Reference state: $\frac{1}{2}N_2$(gas, 0.1 MPa).

References

[91Fri] K. Frisk: Z. Metallkd. **82** (1991) 59–66.