10 mm in length, were cut out from the ingots and annealed at 800°C for 24 hours to remove the internal strain induced during machining. Since the weight loss occuring in the melting process was less than 0.5%, the weight ratio of elements of mixture was adopted as the composition of the alloy. The specimen acted as a core of a coil and the self-inductance of the coil, which is proportional to the initial magnetic permeability of the specimen, was measured with a standard Maxwell bridge, the frequency of 1 kHz.

Hydrostatic pressures were generated with a Bridgman press and transmitting mediums were petroleum ether and kerosene in a temperature range from 77 K to room temperature and above room temperature, respectively. The highest pressure applied was 8 kb. The details of the construction of the pressure generator and the connection with the pressure bomb are referred to the article of Tatsumoto *et al.*[9]

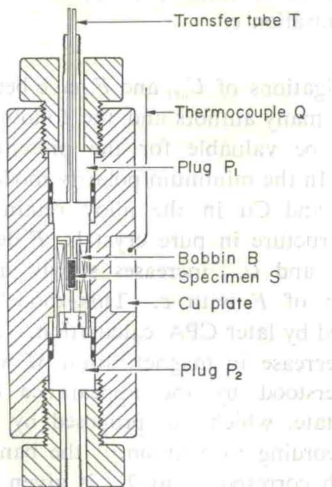

Fig. 1. Diagram of the pressure bomb. T: Stainless steel transfer tube to the pressure intensifier, P_1: Retaining plug, P_2: Plug for electrodes, S: Specimen, B: Bakelite bobbin, Q: Thermocouple.

Figure 1 shows the diagram of the pressure bomb. The bomb was made of steel, and the inner diameter, outer diameter and the length were 13 mm, 60 mm and 173 mm, respectively. In the figure, T is the stainless steel transfer tube connected with the pressure intensifier, P_1 the retaining plug and P_2 the plug for electrodes. The specimen S is inserted in the bakelite bobbin B and is slightly pressed with the cap of the bobbin, so that it may not be moved in the process of rise and drop of pressure. The bobbin can be screwed on the top of the plug P_2.

In the experiment for determining the pressure effect on T_c, $\Delta T_c/\Delta p$, in temperatures ranged from 77 K to 640 K, just above the T_c of Ni. In the figure, Q is the chromel-alumel thermocouple and touched to the Cu plate wound on the pressure bomb. Prior to measurements, it was confirmed that the warming process at a rate of one degree per three minutes was enough to equalize the temperature of the specimen to the bomb. The cryostat used is referred to an article of Fujii.[10] In the measurement below 140 K, the freezing temperature of petroleum ether, the pressure bomb in which the pressure was applied in advance at a temperature where the ether is fluid, was slowly cooled in a temperature gradient in such a way that the solidification of the ether began from the bottom of the bomb. The same procedure has been taken also at liquid helium temperature range.[11]

The self-inductance vs temperature curves observed at normal pressure and a pressure are shown in Fig. 2 for $Ni_{90}Rh_{10}$ and $Ni_{80}Rh_{20}$, as examples. The curves drop as temperature rises, but the drop is steeper for the former specimen. The Curie temperatures T_c's in the present work have been defined as the inflection points of the curves, indicated by arrows in the figure and the values of $\Delta T_c/\Delta p$ thus obtained are zero and -0.51 deg/kb for the former and the latter specimens, respectively.

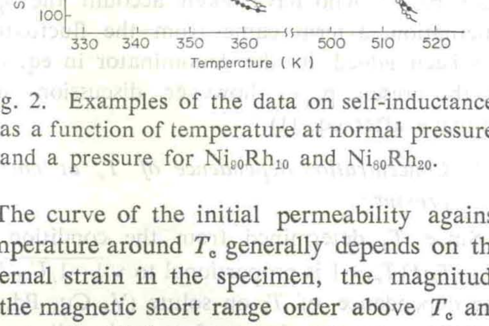

Fig. 2. Examples of the data on self-inductance as a function of temperature at normal pressure and a pressure for $Ni_{90}Rh_{10}$ and $Ni_{80}Rh_{20}$.

The curve of the initial permeability against temperature around T_c generally depends on the internal strain in the specimen, the magnitude of the magnetic short range order above T_c and on the local inhomogeneity of the composition of the alloy. There is a limit, however, in the removal of latter two factors experimentally. When the local inhomogeneity exists, the transition temperature could not be represented uniquely, but distributes within a certain temperature range. Accordingly, the curve drops with a gentle slope around T_c. In such a case, Miyatani[12] has pointed out that T_c may be defined as a temperature corresponding to a middle point of the total decrement of a permeability around the transition temperature, when the distribution is assumed to be Gaussian. However, the distribution will generally deviate from Gaussian and the calculation for such a case shows that temperature of the highest distribution corresponds to the inflection point of the curve. This inflection point coincides with the middle point when the distribution is Gaussian. The determination of T_c in the present work will there-fore be reliable.

In previous measurements of $\Delta T_c/\Delta p$ on Ni-Cu[1] and -Pd alloys,[2] T_c was determined from the measurements of transverse forced magnetoresistance.

§ 3. Results and Discussions

In the following discussions on $\Delta T_c/\Delta p$ in the present work, the Curie temperture T_c, defined as a temperature where enhanced susceptibility χ diverges, has been considered. Above T_c, χ is given by, on the basis of the itinerant electron model

$$\chi=\frac{2N\mu_B F}{1-U_{eff}F}\,, \tag{1}$$

where μ_B is the Bohr magneton, N the total number of atoms, U_{eff} the effective correlation energy and F the state density at the Fermi level of the material in which U_{eff} is not taken into account.

In the recent investigation by Moriya and Kawabata[13] who have taken account the spin fluctuation, a term came from the fluctuation has been added in the denominator in eq. (1). In the present paper, however, discussions will be made after eq. (1).

3.1 *Concentration dependence of T_c at normal pressure*

Since T_c determined from the condition of $U_{eff}(T_c)F(T_c)=1$ is proportional to $\sqrt{1-1/U_{eff}F}$,[4] the dependence of T_c on solute (V, Cu, Pd, Pt and Rh) concentration c of respective alloy may reflect the variation of U_{eff} and F, especially in the form of product $U_{eff}F$ with c.

Figure 3 shows the Curie temperatures of Ni-V, -Cu, -Pd, -Pt and -Rh alloys observed as a function of c and results are in agreement with literature data.[14,15] In order to discuss $\Delta T_c/\Delta p$, the variation of U_{eff} and F with c at normal pressure may be required in advance for each alloy presently concerned.

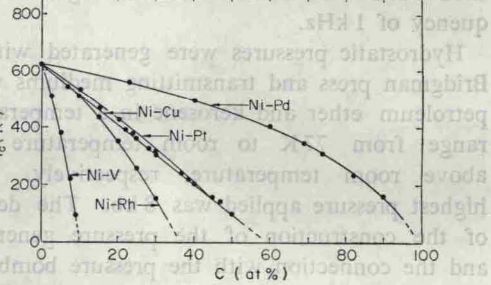

Fig. 3. Curie temperature at normal pressure as a function of solute (V, Cu, Pd, Pt and Rh) concentration c.

Investigations of U_{eff} and F have been roughly made by many authors and the following results seem to be valuable for the present purpose. Ni-Cu: In the minimum polarity model,[3] where both Ni and Cu in the alloy retain the electronic structure in pure crystals, F decreases as $(1-c)F_{Ni}$ and U_{eff} increases slowly due to the variation of F with c. This model has been supported by later CPA calculation. Ni-V: The rapid decrease in magnetization M with c may be understood by the appearance of virtual bound state, which was proposed by Friedel.[16] Also according to Mathon,[17] the band splitting Δ, which corresponds to T_c, is given by $U_{eff}M$. Since T_c decreases rapidly with c, U_{eff} seems to be almost constant and F might change in accordance with the change in M. This constancy of U_{eff} is also expected from that the critical concentration c_F where ferromagnetism disappears is small for this alloy. The situation therefore will be similar to that of Ni-Cu. Ni-Pd and -Pt: Though Pd, Pt and Ni have been considered as isoelectronic, the variation of T_c with c for Ni-Pd and -Pt have been investigated in different ways. Ni-Pd alloys have been investigated on the basis of local enhancement model, in which Ni rather than Pd are attributable to the divergence of χ or to T_c. Estimations of Harris and Zuckermann[18] covered the