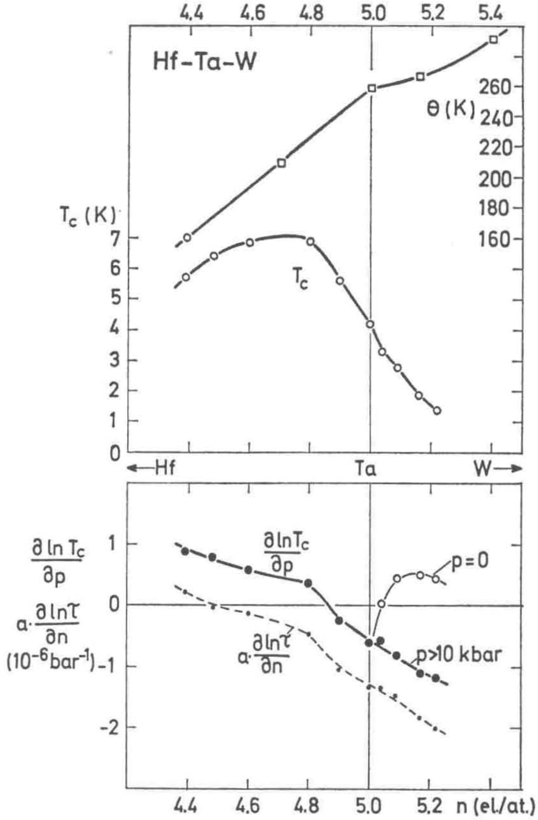

Fig. 1. Lower part: measured slopes $\partial \ln T_c/\partial p$. For $p > 10$ kbar comparison is made with $\partial \ln \tau/\partial n$. Relevant parameters are plotted in the upper part

In the Table 1 we list the relevant new data. We note that T_c of our Ta is rather low.

The data on the effect of *pressure* on these alloys are shown in Fig. 1, including values for T_c and the Debye characteristic temperature θ, if known[8,9]. For pressures in excess of 10 kbar, the slope $1/T_{c0} \cdot \partial T_c/\partial p \approx \partial \ln T_c/\partial p$ decreases monotonically with increasing number n of valence electrons per atom. Proceeding as for the Zr-Nb-Mo alloys, we have plotted the quantity $a \cdot \partial \ln \tau/\partial n \equiv a(\partial \ln T_c/\partial n - \partial \ln \theta/\partial n)$.

9 We wish to thank G. Dammer and K. Mulder of this Laboratory for permitting us to use their unpublished data for $Hf_{61}\,Ta_{39}$.

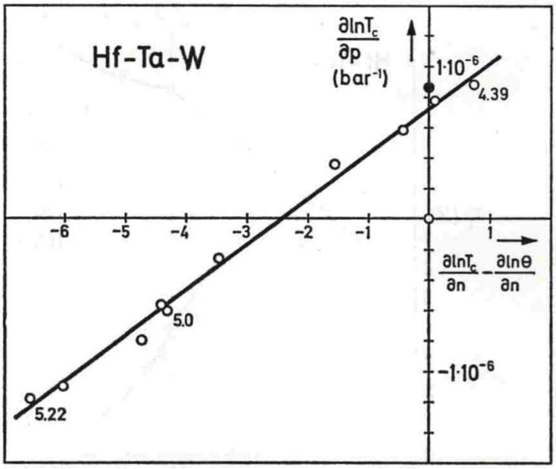

Fig. 2. Plot showing the linear relation between $\partial \ln T_c/\partial p$ and $\partial \ln \tau/\partial n$ for all alloys. The full circle represents $\partial \ln \theta/\partial p$ for Ta

One notes that for Hf-Ta-W-alloys it is also linearly related with $\partial \ln T_c/\partial p$, according to

$$\partial \ln T_c/\partial p = a(\partial \ln T_c/\partial n - \partial \ln \theta/\partial n) + b. \tag{2}$$

This is also shown in Fig. 2, from which the values of the constants $a = 0.30 \cdot 10^{-6}$ bar^{-1} and $b = 0.74 \cdot 10^{-6}$ bar^{-1} are readily obtained.

Inserting $T_c \propto \theta \exp(-1/g)$ in Eq. (2) yields

$$g^{-2} \cdot \partial g/\partial p + \partial \ln \theta/\partial p = g^{-2} \cdot a \cdot \partial g/\partial n + b. \tag{3}$$

For Ta the literature value of $\partial \ln \theta/\partial p = \gamma_G \cdot \kappa = 1.82 \cdot 0.48 \cdot 10^{-6}$ bar^{-1} = $0.87 \cdot 10^{-6}$ bar^{-1} [(10)] is close to the value of our term $b = 0.74 \cdot 10^{-6}$ bar^{-1} (γ_G = Grüneisen parameter, κ = compressibility). Thus, under the resonable assumption that $\partial \ln \theta/\partial p$ does not change much with composition, Eq. (3) reduces to Eq. (1), with $a = (0.30 \pm 0.02) \cdot 10^{-6}$ bar^{-1}.

For Ta-W alloys kinks in the otherwise linear $T_c(p)$-dependence are observed near $p = 10$ kbar, as indicated by the splitting of $\partial \ln T_c/\partial p$ in Fig. 1. A similar behaviour was observed in the Zr-Nb-Mo system. However, $Nb_{96}Zr_4$ and Nb were also involved and the changes in slope occured near 20 kbar. We will refer to this effect in another paper.

10 Gschneidner, K. A.: In: Solid State Physics **16**, 275 (1964), edited by F. Seitz and D. Turnbull. London-New York: Academic Press.