In the first approximation we have:

$$\alpha = a^{*}/2kT \qquad \beta = -E^{*}/2kT^2$$

$$\gamma = -E^{*}/a^{*}T \qquad z = -a^{*2}/2kE^{*}$$

For Te and InSb we have the averaged values:

$$E^{*}_{Te} = 0{\cdot}25\,eV \qquad a^{*}_{Te} = -1{\cdot}8 \times 10^{-5}\,eV/atm$$

$$E^{*}_{InSb} = 0{\cdot}18\,eV \qquad a^{*}_{InSb} = 1{\cdot}5 \times 10^{-5}\,eV/atm$$

The basic parameters for these crystals are listed in Table 2. Some selected, experimental results for Te are given in Fig.3. The most important disadvantage of the gauge with a single semiconductor crystal is its temperature dependence; greatest difficulties are caused by temperature variations due to pressure changes. Two of the present authors [5] reduced considerably the effect of temperature on the accuracy of the readings by connecting Te and InSb crystals in the neighbouring branches of a Wheatstone bridge (Table 2, item 6). Very recently Czaputowicz found that Te monocrystals can be prepared whose resistivity in the range 10 to 50°C is a parabolic function of temperature (cf. Eq.2). Since the maximum of the function is at 30°C, we obtain a new practical possibility of temperature compensation (cf. Tables 1 and item 7).

On the Possibilities of Applying Planar Transistors as High-pressure Gauges.

The effects of hydrostatic pressure on the p-n junction where measured [6-8]. Włodarski examined some properties of a silicon n-p-n planar transistor (OE, OB connections). From the experimental data two groupes of results were selected:

$I_c = f(P,T)$ where: V_{CE} = const., V_{BE} = const., for which $|z|$ = max, and

$V_{BE} = f(P,T)$ where: V_{CE} = const., I_C = const., for which $|z|$ = min.

The largest variation in the collector current for a given pressure system is observed for the common emitter mode of operation of the transistor. Any change in the base current due to the application of pressure is multiplied by the

multiplication current factor of the transistor. Some experimental data are presented in Figs. 4,5,6 and 7, and the basic parameters in Table 2.
Silicon has high values of E^{*}, $|\beta_R|$, $|\gamma_R|$ where: R - resistivity and also shows a relatively high melting point. This is why silicon planar transistors may be used for measuring high pressures at elevated temperatures.

The comparison of the coefficients of pressure quality for all the examined electric sensors is presented in Table 2 and Fig.8. Further studies on the application of metals and semiconductors as electric high-pressure sensors are in progress.

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