Table 1. Application of empirical equation in the calculation of "K"

| Compound           | Form   | Main absorption wavelengths (λ, microns) | "K"     | Per cent<br>difference<br>from average |
|--------------------|--------|--|---------|--|
| $\mathrm{BeF}_{2}$ | qtz.   | 13.1                                     | 0.167   | - 0.6                                  |
| SiO <sub>2</sub>   | qtz.   | 9.15                                     | 0.170   | + 1.2                                  |
| $GeO_2$            | qtz.   | 11.5                                     | 0.169   | + 0.2                                  |
| $GeO_2$            | rutile | 14.0                                     | 0.166   | - 1.2                                  |
|                    |        | Average                                  | 0.168   |  |
| BPO <sub>4</sub>   | qtz.   | 8.92                                     | 0.141   | -16.0                                  |
| BAsO <sub>4</sub>  | qtz.   | 10,45                                    | 0.151   | -10.0                                  |
| $AlPO_4$           | qtz.   | 8.9                                      | . 0.172 | + 2.4                                  |
| AlAsO <sub>3</sub> | qtz.   | 10.56                                    | 0.159   | - 5.3                                  |
| GaPO <sub>4</sub>  | qtz.   | 9.55                                     | 0.197   | +17.2                                  |
| GaAsO <sub>4</sub> | qtz.   | 11.25                                    | 0.166   | - 1.2                                  |
| $FePO_4$           | qtz.   | 9.7                                      | 0.179   | + 6.5                                  |
| GaSbO <sub>4</sub> | rutile | 14.4                                     | 0.171   | + 1.8                                  |

For the  ${\rm ABO_4}$  compounds, arithmetical averages are used for the cation mass or atomic number components. A weighted average is used for the cation charge, calculated as

$$Z_{(A \cdot B)} = \frac{Z_A^2 + Z_B^2}{Z_A + Z_B}$$
.

## Molar refractivities

In Table 2 there are presented molar refractivities (Rm) of a few  $AX_2$  and  $ABX_4$  compounds having mainly the silica and rutile structures. The values are calculated from data in standard reference works  $^{6,7,8}$ , and from data newly obtained in this laboratory. The main purpose here is to show the order of magnitude and trend of Rm in the different known forms of the compounds. Thus for  $SiO_2$  the Rm values of the glass, low eristobalite and low tridymite are about 3.6 per cent above, and that of coesite, 1.8 per cent below the value for quartz. The total percentage difference is very close to that found

evident that this relation ir, and if the cation and he agreement is improved tron content of the bonds

involves the interaction, a reduced mass term  $(\mu)$ , and the absorption wave ving relation was found to  $3eF_2$ ,  $SiO_2$ ,  $GeO_2$ ) and the

$$\frac{1}{1} = 0.168$$
.

ithin  $\pm$  0.002, or within

ction of AX<sub>2</sub> structures, to ilica and rutile structures, a study of the figures of ted differs from 0.168 by p, with individual values at there exists some agreeaview of the complications ary compounds to ternary dered and disordered ar-

compounds shows that a plated series. For example te of calcium have major 4, 11.9 and 12.3 microns ributed to the stretching —O pairs of the "anions", in the square of the wavesame is observed for the or other series.

M, Infra-red absorption spectra 1. Chem. 22 (1950) 1478—1497. rtional to the 1/3 power of the s, of the sum of extranuclear ed as being proportional to the ning directions modifying the

<sup>&</sup>lt;sup>6</sup> Data on Chemicals for Ceramic Use. Bulletin 118, National Research Council, Washington, D. C. (1949).

<sup>&</sup>lt;sup>7</sup> J. D. H. DONNAY and W. NOWACKI. Crystal Data. Geol. Soc. Am., Memoir 60 (1954).

<sup>&</sup>lt;sup>8</sup> Standard X-Ray Diffraction Powder Patterns. Circular 539, Nat. Bu. Standards, Washington, D. C., Vols. 1—7 (1953—1957).