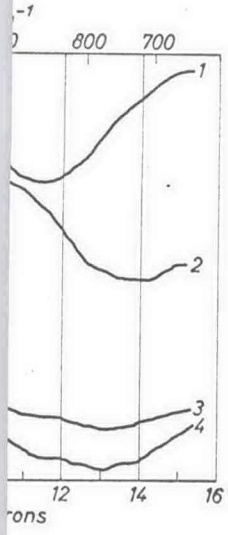
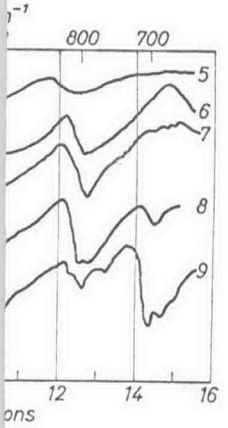
$aSbO_4$ rutile form are shown in
made on the basis of these and

y coordination of the cation it
ning frequency. Moreover, the



2—15.5 micron region. 1. GeO_2
coesite. (Sample preparation—KBr
in 0.3 g KBr.)



–15.5 micron region. 5. SiO_2 glass
ite; 8. SiO_2 quartz; 9. SiO_2 coesite.

ratio of the squares of the wavelengths, in the case of Ge^{4+} changing from four to six coordination, is 1.48, or nearly 6/4. Whether this is mere numerical coincidence or whether it reflects a simple mathematical connection between the effect of coordination on the interionic distance and hence on the force constant, cannot be adequately checked until more examples are at hand.

2. The effect of even major changes in secondary coordination (Buerger's terminology) does not affect the *main* cation-anion stretching absorption band. Thus the patterns of cristobalite, tridymite, quartz and coesite are very similar although there is a 25 per cent volume spread. The coordination of Si^{4+} is therefore four in coesite although there may be a greater variety of Si—O distances in coesite than in quartz as indicated by the structure in the main Si—O band. The BeF_2 polymorphs bear out this hypothesis very well (Fig. 1). Hence the increase in density in going from quartz to coesite is realized only by a new packing of tetrahedra and not by increased coordination.

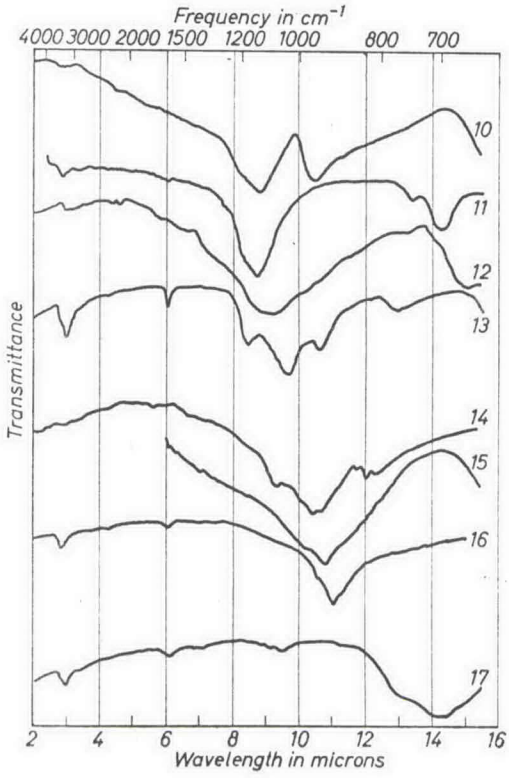


Fig. 3. Infra-red absorption spectra in the 2—15.5 micron region. 10. BPO_4 quartz; 11. $AlPO_4$ quartz; 12. $GaPO_4$ quartz; 13. $FePO_4$ quartz; 14. $BAsO_4$ quartz; 15. $AlAsO_4$ quartz; 16. $GaAsO_4$ quartz; 17. $GaSbO_4$ rutile.

3. The effect of mass on absorption frequency has been known for decades in molecular spectroscopy. An inspection of the infra-red absorption spectra published by Miller and Wilkins[3] or by Hunt,

[3] F. A. Miller and C. H. Wilkins, Infra-red spectra and characteristic frequencies of inorganic ions. Anal. Chem. 24 (1952) 1253—1299.