bond lengths and angles are equal in the two halves.

In the crystals of potassium barium hexathionate the configuration of the sulphur chain is *cis-cis*. Thus, in the pentathionates and the one hexathionate for which structural data so far are available, the sulphur chain has the same configuration as in orthorhombic sulphur. Whether or not this is the preferred form of the ions, or due in some measure to the presence of oxygen-coordinating barium ions in the crystals, must await a study of other salts. A *trans* five-membered sulphur chain occurs in sulphur dimethanethiosulphonate [9], and a *trans-trans* six-membered one in cesium hexasulphide [10].

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Preliminary Note on the Solubility of Oxygen in α-Zirconium

BO HOLMBERG and ARNE MAGNÉLI

Institute of Inorganic and Physical Chemistry, University of Stockholm, Stockholm, Sweden

In the course of studies on the crystal chemistry of titanium and vanadium oxides at elevated temperatures which are being carried out at this Institute with the sponsorship of the Office, Chief of Research and Development, U.S. Department of Army, through its European Office, ordered phases have been found to occur in the solid solubility range of oxygen in α-titanium [1]. In connection with these studies an investigation has also been started of the corresponding region of the zirconium-oxygen system.

The solubility limit for samples heat-treated at 800°C has been found to be close to the composition $ZrO_{0.40}$ in agreement with data reported by previous authors [2]. The length of the a axis reaches a maximum at the approximate composition $ZrO_{0.25}$ ($a(Zr) = 3.232$ Å(3), $a(ZrO_{0.25}) = 3.256$ Å, $a(ZrO_{0.40}) = 3.245$ Å), while the length of the c axis increases with increasing oxygen content over the whole solubility range ($c(Zr) = 5.148$ Å(3), $c(ZrO_{0.25}) = 5.188$ Å, $c(ZrO_{0.40}) = 5.207$ Å). The behaviour is similar to that observed for the titanium-oxygen system [4].

When annealed at 800°C the sample $ZrO_{0.30}$ gives X-ray powder photographs which show the oxygen atoms to be distributed at random in the interstices of the zirconium lattice. The preparation $ZrO_{0.35}$, similarly heat-treated, gives a powder pattern essentially corresponding to a structure of *anti*-$Cd(OH)_2$ type. The oxygen atoms should thus occur only in every second layer of octahedral holes extending normally to the c axis. About 30 % of these holes must thus be vacant. The metal atoms are slightly forced apart by the interstitial atoms. The z parameter of the zirconium atoms thus acquires the value of 0.26 as compared to 0.25 for the ideal structure. There are, however, also indications of the vacancies in the oxygen positions being ordered. Research on this matter will be continued.

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