

cm.⁻¹ The intensity distribution in these heads suggests the probability of ν 20340 as the (0, 0) head. The two systems may be designated as γ and α respectively, on the analogy of the ZrO^1 and the TiO^2 bands which the present bands resemble closely.

Analysis of the bands is in progress and details will be published shortly.

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1. F. Lowater, *Proc. Phy. Soc.*, 1932, **44**, 51.
2. *Ibid.*, 1928, **41**, 557.

GYPSIFICATION OF APATITES IN THE KODURITES

DURING the course of detailed chemical and optical studies of the Kodurites from the manganese mines of the Garividi area in the Vizagapatam district, a rather unusual case of the alteration of apatite to gypsum along the peripheral zones was noticed. The apatite is a manganese fluor variety with the formula $3(Ca.Mn)_3.P_2O_8.Ca(F_2.Cl_2)$. During the optical examination, it was noted that the periphery of the apatite showed different optical features from those normal to the apatite. The central grain shows uniaxial negative characters with straight extinction, whereas the peripheral zone is biaxial negative with inclined extinction which polarizes with second order blues and pinks, characteristic of gypsum. The analysis of the apatite and its modal composition indicated 92.93% of apatite and 7.07% of gypsum.

Chertification and kaolinisation are universal in the Kodurites. The problem of the origin of the cherts and kaolin in this area as elsewhere is a debatable point, *i.e.*, whether it is due to hydrothermal or meteoric alteration.

Vogt¹ in common with several other investigators attributed kaolinisation of the felspars to carbonated waters. Lindgren² controverted this view on the ground that the pure aluminic silicate cannot be formed in the presence of carbonated waters alone and that the presence of H_2SO_4 is essential to bring about kaolinisation. Fermor³ ruled out this possibility on the ground that there was no evidence of the presence of the influence and action of H_2SO_4 in the Kodurites. The gypsification of the apatites in the

Kodurites of the Garividi area is fairly frequent and this points clearly to the action of sulphuretted waters. Therefore, it appears that the view put forward by Lindgren regarding the importance of H_2SO_4 in kaolinisation of felspars really finds a support here since there is a replacement of apatite by gypsum ($CaSO_4 \cdot 2H_2O$). The authors do not, however, claim that this alteration is brought about exclusively by hydrothermal agencies.

We are not aware of any reported occurrence of the gypsification of apatites in literature.

A detailed paper embodying the results of chemical and optical study of the Kodurites and associated formations by one of us (G.P.R.) is under publication elsewhere.

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March 16, 1949.

1. Vogt, *Trans. Amer. Inst. Ming. Eng.*, **31**, 150.
2. Lindgren, Waldemer, *Ibid.*, **30**, 658.
3. Fermor, L. L., "Manganese-Ore Deposits of India," *Mem. G. S. I.*, **37**, 274-75.

VANADAMETRY—PART III

Volumetric Estimation of Ferrous Salt in the Presence of Phenols

IN Parts I and II of this series the advantages of sodium vanadate as a volumetric reagent in place of permanganate or dichromate have been emphasized. Viswanadham and Gopala Rao³ have shown that citric acid in ferrisubchloridum citratum B.P. interferes in the estimation of ferrous iron, by potassium dichromate. They have proposed the use of sodium vanadate. Lyons and Appleyard¹ who found a similar interference by citric acid and sugars proposed ceric sulphate for the estimation. Ferrey⁵ showed that ceric sulphate does not give satisfactory results in the estimation of ferrous iron in the presence of phenol. As several phenolic compounds are used in pharmaceutical preparations as preservatives, it was considered necessary to investigate the problem in detail.

We have now found that dichromate oxidizes phenol, ortho-cresol, paracresol, *m*-cresol, and resorcinol, in the presence of ferrous salts by an induced mechanism. Ceric sulphate is capable of oxidizing the phenolic compounds even in the absence of ferrous salts to dirty coloured compounds