may be increased by the suction induced by the rapidly flowing water at the tip.

Mayne¹ has shown that rapid oxidation of ferrous hydroxide at a pH value greater than 5 gives goethite while slow oxidation leads to the formation of an intermediate between magnetite and ferric oxide ($\gamma\text{Fe}_2\text{O}_3$). Thus the formation of goethite in the present case is readily explained. The formation of magnetite, the second constituent, is not likely to occur in the same area at the same time as goethite since slow oxidation would appear to be necessary. Therefore, the oxidation to form this compound must occur in some areas sheltered from the direct action of the water. This may occur in pockets of ferrous ion-containing water trapped in the goethite crystals or by slow oxidation of the ferrous ion during its passage through the whisker either by a small amount of oxygen contained in the water or by oxygen diffusing through the wall of the tubule.

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¹ Mayne, J. E. O., *J. Chem. Soc.*, 129 (1953).

Radiochromatography of Alkali Ions

IN their recent communication¹, Modreanu, Fisel and Carpv state "only three mixtures of solvents seem to have been proposed to accomplish the chromatographic separation of potassium, rubidium and caesium". These methods being "tedious", they use nitrobenzene saturated with water as solvent for the separation of potassium, rubidium and caesium spotted as picrates on Whatman paper No. 4. I have, however, shown that an even larger range of alkali ions, namely, lithium, sodium, potassium, rubidium and caesium, could be separated employing a markedly simpler procedure². This merely used acid-washed asbestos paper and dilute hydrochloric acid as solvent. The use of radioisotopes as tracers, namely, sodium-22, potassium-42, rubidium-86, caesium-137, both expedited and simplified the analysis of the chromatogram. In the case of lithium, however, a Perkin-Elmer flame photometer was used to determine its *répartition*. The following R_F values were obtained for tracer to milligram concentrations of the different alkali ions with 0.1 N hydrochloric acid as solvent on bands of asbestos paper 12 mm. wide, 25 cm. long and 0.2 mm. thick.

Li ⁺	Na ⁺	K ⁺	Rb ⁺	Cs ⁺
0.99	0.86	0.77	0.72	0.45

Results on electromigration of ions in fused salts³ showed that heavier ions tended to become 'fixed' preferentially on the asbestos paper used as support. This was confirmed by their chromatographic separation with the same solvent (dilute hydrochloric acid) on Whatman filter paper treated with 'Dowex'-50 following Lederer's technique⁴, as also on similar ion-exchange resin-coated cellulose filter paper supplied by Carl Schleisser and Schül⁵. From the similarity of results it was shown that asbestos functions as an ion-exchanger of feeble capacity.

In the study of the isotope effect in the electromigration of a mixture of caesium-131 and caesium-137 ions in fused sodium nitrate⁵ this technique of asbestos paper chromatography was used to obtain caesium free from sodium from samples initially con-

taining more than a 1,000-fold excess of the latter. Simple ascending chromatographic development with distilled water as solvent sufficed for the complete separation of caesium and sodium, the R_F values under these conditions being: Cs⁺, 0.0, and Na⁺, 0.75.

Grateful thanks are due to [the late] Prof. F. Joliot-Curie, in whose Laboratoire de Physique et Chimie Nucléaires, Collège de France, Paris, this work was done, and to Dr. M. Chemla for valuable guidance.

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⁴ Lederer, M., and Kertes, S., *Anal. Chim. Acta*, **15**, 226 (1956).

⁵ Arnkar, H. J., and Chemla, M., *Unesco Conf. Radioisotopes*, Paris, Sep. 1957, Comm. No. 214.

A New Form of Tricalcium Phosphate

WE have established that the α -form of tricalcium phosphate is not the highest-temperature form of this compound as hitherto believed¹⁻³. At 1,430°C., the α -form inverts to the true highest-temperature polymorph, which is capable of forming an uninterrupted range of solid solutions with the α -form of dicalcium silicate. This new polymorph, which we have designated 'super- α -tricalcium phosphate', does not survive quenching to room temperature. Characteristic optical changes accompanying the $\alpha \rightleftharpoons$ super- α -tricalcium phosphate transformation were first observed by a high-temperature microscope technique which has been described⁴, and the existence of the super- α -form was confirmed by high-temperature X-ray analysis using recently developed equipment⁵.

Full details of this work will be published elsewhere.

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Structure of Cupric Mono-, Di- and Tri-bromoacetates

IT was concluded in our former communication¹ that cupric mono- and di-chloroacetates in the crystalline state and in ordinary organic solvents might consist of the binuclear molecules with a sort of copper-to-copper linkage, though cupric trichloroacetate does not have a similar binuclear molecule in the crystalline state or in dioxan. The exceptional structure of cupric trichloroacetate may be ascribed to the accumulation of the inductive effect of the three chlorine atoms. In this connexion, it seems interesting to see what type of structure may be involved in the cupric bromoacetates. Therefore, we examined the structure of cupric mono-, di- and tri-bromoacetates, using the criteria previously derived: (1) the cupric monocarboxylates involving the binuclear molecules show, in addition to a band at about 40 to 44×10^{13} c./s., a special absorption band at about 80×10^{13} c./s., which was regarded as possibly