COMMUNICATIONS TO THE EDITOR

THE X-RAY STUDY OF INDIUM AND THE INDIUM-SILVER SYSTEM

Sir:

Debye–Scherrer–Hull patterns of 99.91% pure indium have been taken at different temperatures ranging from −25 to 141°. The finely divided indium powder mixed with chemically pure sodium chloride was kept at a constant temperature for periods of about two to six days. Only the known face-centered tetragonal modification was detected. Precision determinations of the cell dimensions of indium at 22° gave a = 4.588 Å. and c = 4.938 Å. Moreover, the two linear coefficients of expansion of indium were determined $\alpha_a = 1/a\cdot(\mathrm{d}a/\mathrm{d}T)_P = 5.6 \times 10^{-5}$ and $\alpha_c = 1.3 \times 10^{-5}$.

With regard to the alloy system, seven indium–silver alloys were prepared in a vacuum quartz furnace. Mixtures of sodium chloride and alloy were used in powdered form, and excellent x-ray diffraction data were obtained for the alloys. In connection with the x-ray examination, microdensity determinations of the alloys were made. Five phases were encountered: (1) a face-centered tetragonal solid solution of silver in indium, (2) a complex phase which gave a pseudo-hexagonal close-packed arrangement of atoms, (3) a face-centered cubic phase very rich in indium, (4) a hexagonal phase with an axial ratio of c/a = 1.588 and (5) a face-centered cubic solid solution of indium in silver.

Further work on the indium–silver alloy system is contemplated and a detailed report will appear soon.

Department of Chemistry
The Johns Hopkins University
Baltimore, Maryland
Ludo K. Frevel
Emil Ott

Received December 5, 1934

THE OD+ BANDS

Sir:

The writers have recently photographed the OD^+ bands in the electrodeless discharge in heavy water. These bands correspond to the OH^+ bands discovered by Rodebush and Wahl [This Journal, **55**, 1742 (1933)] which have recently been analyzed by Loomis and Brandt [*Phys. Rev.*, **46**, 79 (1934)]. The intensities appear to be the same, and the isotopic displacement, at least in the O—O band, is about that to be expected. The analysis of these bands is likely to be difficult as was the case with the OH^+ bands.

University of Illinois
Urbana, Illinois
Alfred Clark
W. H. Rodebush

Received December 12, 1934

THE SYNTHESIS OF METHYLCHOLANTHRENE

Sir:

Wieland and Dane's isolation of methylcholanthrene (II) as a degradation product of desoxycholic acid [*Z. physiol. Chem.*, **219**, 240 (1933)] constitutes an important link in the evidence supporting the formulas currently accepted for the bile acids and for the various other natural products related to them. Although the conversion of the hydrocarbon by Cook and Haslewood [*J. Chem. Soc.*, 428 (1934)] into an anthraquinone of established structure leaves little doubt as to the structure of methylcholanthrene, the point in question is of such importance that confirmation by synthesis is desirable. In undertaking such a synthesis we have had in view the further objective of rendering more readily available for animal experimentation the only hydrocarbon of demonstrated carcinogenic activity (Cook and Haslewood) which has been obtained from substances normally present in the body.

The pyrolysis of the ketone I appeared to offer a possible route to methylcholanthrene and in order to determine whether the Elbs condensation can be accomplished when the usual methyl group is replaced by the methylene group of an alicyclic ring, we first investigated the following similarly constituted but more readily available ketones: ar-α-tetralyl α-naphthyl ketone (m. p. 107°) and ar-α-tetralyl β-naphthyl ketone (m. p. 183°).