

Citation:

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the righthand side, but on the lefthand side, in which case fig. 9 gives one of the possible situations. The region of incomplete miscibility lies too high here to give the second lower metastable unary point of solidification.

All these T,x -figures can be accurately determined by means of the ζ - x -lines, which has been omitted here for want of space.

It may finally be remarked that the phenomenon of enantiotropy for liquids has never been observed as yet, but the possibility of this phenomenon is beyond all doubt.

Anorg. chem. laboratory of the University.

Amsterdam, Sept. 20, 1912.

Chemistry. — “*The application of the theory of allotropy to the system sulphur*”. II. By Prof. A. SMITS. (Communicated by Prof. A. F. HOLLEMAN).

In a preceding communication ¹⁾ I already pointed out that the theory of allotropy requires that the system sulphur must be considered to be at least *pseudo-ternary*.

On that occasion a T,x -figure was projected by me, which as I stated already then, had still to undergo a simplification by the omission of the region of incomplete miscibility ²⁾. But the figure had to be modified also in another respect, for in the meantime SMITH and CARSON ³⁾ had determined the melting-point line of a third crystallised modification of the sulphur, the so-called *soufre nacré* (mother-of-pearl sulphur), which had been discovered by GERNEZ ⁴⁾.

To keep the representation as simple as possible for the present, the modification required to insert this third crystallised condition of sulphur into our figure, has been accomplished by assuming in the pseudo binary system $S_R - S_M$ and $S_M - S_\mu$ ⁵⁾ above the eutectic point a discontinuity in the monoclinic mixed crystals. In consequence of this the line for the internal liquid equilibrium in the plane for the pseudo-binary system $S_R - S_M$ meets the stable melting-point line of one kind of monoclinic mixed crystals in l_1 , and the metastable branch of the melting-point line of the other kind of monoclinic mixed crystals in l_0 , the same line of equilibrium cutting the metastable part of the

¹⁾ These Proc. XIV 263.

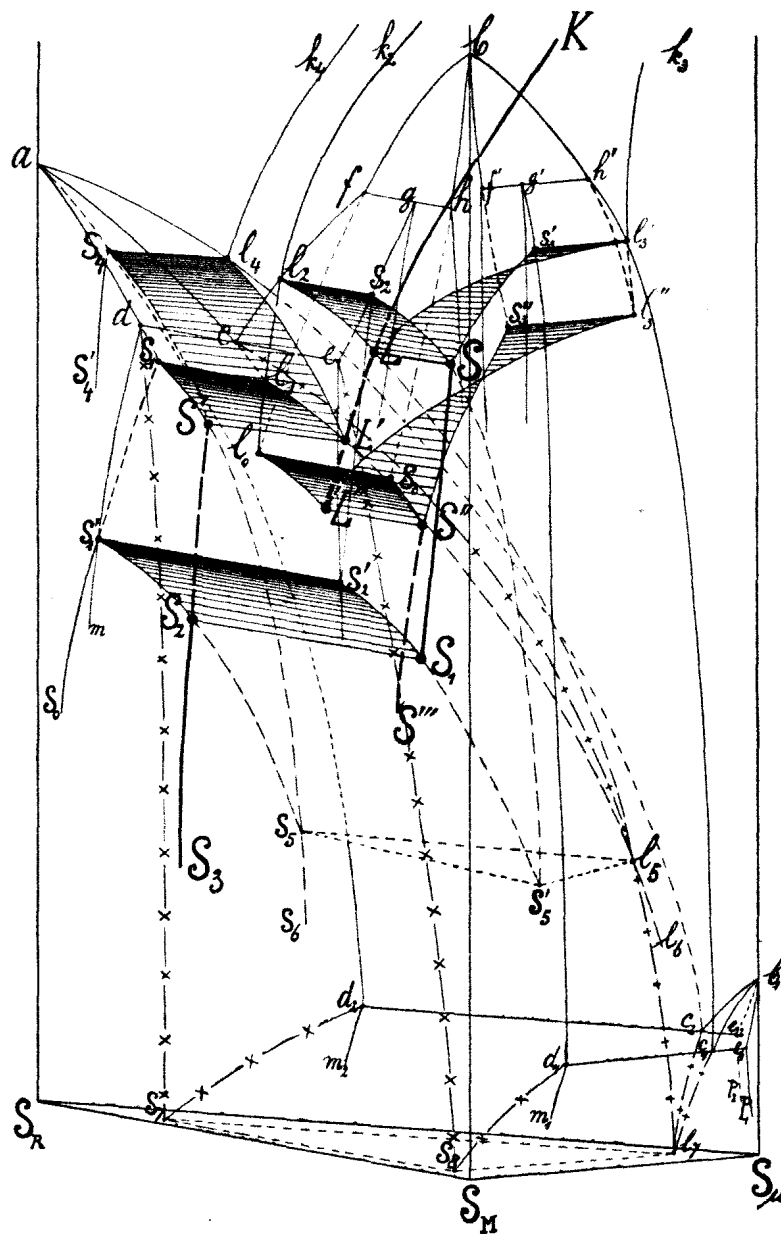
²⁾ „ „ XIV 461.

³⁾ Zeitschr. f. phys. Chem. 77, 661 (1912).

⁴⁾ Journ. de phys. 3, 76 (1884).

⁵⁾ By S_R , S_M , S_μ the pseudocomponents are meant here.

melting-point line of the rhombic mixed crystals in l_1 . If we have once premised this in the plane for $S_R + S_M$, we find the ternary T, x -figure in the same way as was explained in my first communication on this subject, if viz. the fact is allowed for that the transi-



tion point is lowered by the third component, which follows from the experiments carried out by Dr. DE LEEUW at my request¹⁾.

¹⁾ See Versl. Kon. Ak. 28 Sept. 1912, p. 488. This paper will shortly appear in These Proceedings.

In this T,x -figure **L** and **S** denote the coexisting phases at the unary point of solidification of the *monoclinic* sulphur, and in the same way the points **L''** and **S''** indicate the coexisting phases at the unary point of solidification of the monoclinic *soufre nacré*, **L'** and **S'** referring to the unary point of solidification of *rhombic* sulphur, and **S₁** and **S₂** to the coexisting solid phases at the unary point of transition.

In conclusion I will *emphatically* point out that it is very well possible that in many respects the real T,x -figure of the system sulphur deviates from the diagram given here. The system sulphur may be pseudo-quaternary, or even still more complicated. Moreover it is very well possible, indeed it is even probable, that in the pseudo-binary systems no eutectic points occur etc.; but, however strange this may seem, this is just now of minor importance.

At present the only end in view can be this to find a means to express the fundamental thought, that we meet here with a system that is composed of more than two kinds of molecules, and of which not only the unary vapour- and liquid phases, but also the unary solid phases are states in which these different kinds of molecules are in equilibrium. Starting from this idea the figure given here was drawn up, which will probably appear to be able for the present to account satisfactorily for the observed phenomena.

Amsterdam, Sept. 25 1912. *Anorg. chem. lab. of the University*

Chemistry. — “*The inverse occurrence of solid phases in the system iron-carbon.*” By Prof. A. SMITS. (Communicated by Prof. A. F. HOLLEMAN.)

Through an investigation made by RUFF¹⁾ concerning the completion of the T,x -figure of the system iron-carbon I came to the conclusion some time ago that stable carbides probably occur in this system²⁾. Shortly after there appeared an abstract of a preliminary investigation by WITTORF³⁾, written in Russian, which seemed to confirm this surmise. When what seems very probable to me, the results of WITTORF are correct, we meet in the system iron-carbon with a peculiarity, as I demonstrated before, which has been met with up to now only in the system cerium sulphate-water. This peculiarity consists in the inverse occurrence of solid phases. One of

¹⁾ Metallurgie 458, 497 (1911).

²⁾ Z. f. Elektr. Chem. 18, 362 (1912).

³⁾ Russ. phys. chem. Ges. 43, 1613 (1911). Compt. rend 1912, 1091.