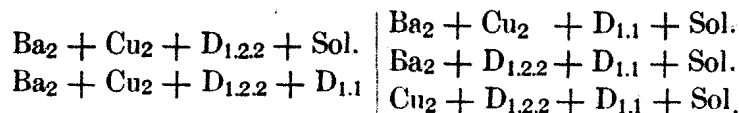
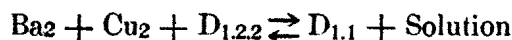


*Citation:*

F.A.H. Schreinemakers & Thonus, J.C., The system  $\text{HgCl}_2\text{-CuCl}_2\text{-H}_2\text{O}$ , in:  
KNAW, Proceedings, 15 I, 1912, 1912, pp. 472-474

If, for the sake of brevity, we call  $\text{Ba Cl}_2 \cdot 2\text{H}_2\text{O} = \text{Ba}_2$  and  $\text{Cu Cl}_2 \cdot 2\text{H}_2\text{O} = \text{Cu}_2$ , the reaction is then:



Hence, of the invariant (*P*) equilibrium two monovariant (*P*) proceed to lower and three to higher temperatures, or if we only consider the systems in which a solution occurs, one to lower and three to higher temperatures.

The system proceeding to lower temperatures:  $\text{Ba}_2 + \text{Cu}_2 + \text{D}_{1.2.2} + \text{sol.}$  still exists at  $40^\circ$  and is represented in fig. 1 by the point *h*. The system proceeding to higher temperatures:  $\text{Cu}_2 + \text{D}_{1.2.2} + \text{D}_{1.1} + \text{solution}$  terminates at  $57^\circ$ , when the solution only still contains the three components  $\text{CuCl}_2$ ,  $\text{KCl}$  and water.

The other two systems proceeding to higher temperatures still exist at  $60^\circ$ ; the solution of the system  $\text{Ba}_2 + \text{Cu}_2 + \text{D}_{1.1} + \text{solution}$  is represented in fig. 2 by the point *l* and that of the system:  $\text{BaCl}_2 + \text{D}_{1.2.2} + \text{D}_{1.1}$  is indicated in fig. 2 by the point *h*.

**Chemistry.** — “*The system  $\text{HgCl}_2$ — $\text{CuCl}_2$ — $\text{H}_2\text{O}$ .*” By Prof. F. A. H. SCHREINEMAKERS and J. C. THONUS.

(Communicated in the meeting of September 28, 1912).

In order to ascertain whether or not the salts  $\text{HgCl}_2$  and  $\text{CuCl}_2$  form a double salt, the isotherm of  $35^\circ$  was determined; the result of this investigation is that, at  $35^\circ$  no double salt was found but that the salts  $\text{HgCl}_2$  and  $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$  can exist by the side of each other.

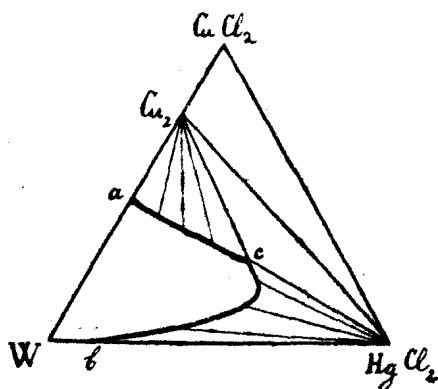


Fig. 1.

In fig. 1, the experimentally determined isotherm of  $35^\circ$  is represented schematically; the apexes W,  $\text{HgCl}_2$  and  $\text{CuCl}_2$  represent the three components, and the point  $\text{Cu}_2$  the hydrate  $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$ .

The isotherm consists of the two branches *ac* and *bc*; *ac* indicates the solutions which are saturated with the hydrate  $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$ , *bc* those saturated with

$\text{HgCl}_2$ ; the point of intersection  $c$  of the two saturation lines represents the solution saturated with  $\text{CuCl}_2 \cdot 2\text{H}_2\text{O} + \text{HgCl}_2$ .

The solubility curve  $bc$  of the  $\text{HgCl}_2$  has a peculiar form; for a tangent may be drawn to it parallel to the side  $W \cdot \text{CuCl}_2$ . This means, in our case, that the solubility of  $\text{HgCl}_2$  first increases and then decreases with an increased  $\text{CuCl}_2$ -content of the solution. From the Fig. 1 it is shown that the solubility of  $\text{HgCl}_2$  is much increased by addition of  $\text{CuCl}_2$ ; from the table we see that the solubility of  $\text{HgCl}_2$ , which in pure water amounts to 8.51 %, can increase to fully 52 % by addition of  $\text{CuCl}_2$ .

The isotherm represented schematically in fig. 1 can be drawn with the aid of the determinations communicated in the table. As not only the compositions of the liquids, but also those of the corresponding "residues" have been determined, the composition of the solid substance may be deduced therefrom. We find that the solutions of branch  $ac$  are saturated with  $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$  and those of  $bc$  with  $\text{HgCl}_2$ .

Compositions in % by weight at 35°.

of the solution		of the residue		solid phase
% $\text{CuCl}_2$	% $\text{HgCl}_2$	% $\text{CuCl}_2$	% $\text{HgCl}_2$	
44.47	0	—	—	$\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$
33.5	21.03	51.0	13.04	"
26.07	37.3	55.82	16.97	"
23.31	44.47	54.77	19.70	"
21.49	50.45	43.60	36.63	$\text{CuCl}_2 \cdot 2\text{H}_2\text{O} + \text{HgCl}_2$
21.47	50.60	15.08	74.35	" + "
21.54	50.37	—	—	" + "
19.40	52.44	3.0	91.94	$\text{HgCl}_2$
18.48	52.54	4.6	87.57	"
18.06	52.81	3.17	90.06	"
14.73	51.03	—	—	"
5.94	49.5	—	—	"
2.64	23.87	—	—	"
0	8.51	—	—	"

One of us has previously deduced the rule<sup>1)</sup> that the metastable continuations of the branches *ac* and *bc* must fall both together either within or without  $\angle \text{Cu}_2 \cdot \text{c} \cdot \text{HgCl}_2$ . Which case occurs here is difficult to prove experimentally as both branches, in the vicinity of point *c* practically coincide with the sides of the angle  $\text{Cu}_2 \cdot \text{c} \cdot \text{HgCl}_2$ . Moreover, the saturation line *bc* of the  $\text{HgCl}_2$  exhibits a very peculiar form. The metastable continuation must, of course, terminate somewhere on the side  $\text{HgCl}_2$ — $\text{CuCl}_2$  of the triangle; from the course of the stable part in the vicinity of *c*, it appears, however, that this will not be possible without a point of inflexion appearing somewhere on the metastable part or on the stable part situated in the vicinity of *c*.

**Chemistry.** — “*The system Tin-Iodine*”. By Prof. W. REINDERS and S. DE LANGE. (Communicated by Prof. SCHREINEMAKERS.)

(Communicated in the meeting of September 28, 1912).

1. Of tin and iodine two compounds are known, stannous and stannic iodide. As regards the preparation and properties of these compounds there exist in the literature different conflicting statements. By the older investigators<sup>2)</sup>, for instance, it is stated that on heating tin with iodine, stannous iodide is formed. HENRY<sup>3)</sup>, however finds a mixture of  $\text{SnI}_2$  and  $\text{SnI}_4$  and PERSONNE<sup>4)</sup>  $\text{SnI}_4$  only. The melting point of  $\text{SnI}_4$  is given by PERSONNE<sup>4)</sup> as  $145^\circ$  (solidifying point  $142^\circ$ ), by EMICH<sup>5)</sup>  $143^\circ$ . The boiling point according to PERSONNE is at  $295^\circ$ , EMICH finds  $341^\circ$ . HENRY, however, states that it sublimes at  $180^\circ$ .

Of  $\text{SnI}_2$  the melting point is given both at  $246^\circ$ <sup>6)</sup> and at a dull red heat (PERSONNE) and the boiling point both at  $295^\circ$ <sup>7)</sup> and at the temperature of molten glass (PERSONNE).

For the knowledge of the binary systems of a metal and a metalloid a renewed investigation was therefore desirable.

2.  $\text{SnI}_4$  was prepared in two ways, *a.* by treating granulated tin for some days with a solution of iodine in carbon disulphide and

<sup>1)</sup> F. A. H. SCHREINEMAKERS, Die heter. Gleichg. von BAKHUIS ROOZEBOOM. III'. 268.

<sup>2)</sup> I. a. BERZELIUS, Traité de chimie; RAMMELSBERG, Pogg. Ann. 48, 169.

<sup>3)</sup> Phil. Trans. 135, 363 (1845).

<sup>4)</sup> Compt. rendus. 54, 216 (1862).

<sup>5)</sup> l. c.

<sup>6)</sup> Sitzungsber. der K. Ak. v. W. Wien 113, IIb, 535 (1904) (Monatshefte 25, 907.

<sup>7)</sup> COHEN, Abegg's Handbuch d. anorg. Ch. III. 2, 571.