

*Citation:*

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itself oxidised to potassium cyanate which of course, yields immediately  $\text{H}_3\text{N}$  and  $\text{CO}_2$ . It is by no means such a handy deoxidising agent as  $\text{Na}_2\text{S}_2$ . Only in the case of para-dinitrobenzene, was the azoxy-compound obtained as a properly crystallisable product; in the case of the two other isomers brown amorphous substances are formed; the ortho-compound yields a decided quantity of nitrophenol owing to  $\text{KOH}$  being set free by hydrolysis.

The action of potassium cyanide in alcoholic solution is of much more importance. It is first of all remarkable that it does not act on ortho-dinitrobenzene whilst it behaves towards para-dinitrobenzene as if its solution were dissociated into  $\text{KOCH}_3(\text{C}_2\text{H}_5)$  and  $\text{HCN}$ . This difference in behaviour is not easy of explanation. In the second place, the behaviour of meta-dinitrobenzene is interesting. The formation of the two substances  $\text{C}_6\text{H}_3 \cdot \text{OCH}_3(\text{C}_2\text{H}_5) \cdot \text{CNNO}_2$  1. 2. 3. may be best explained by assuming that the  $\text{CN}$ -group first takes up a position between the two  $\text{NO}_2$ -groups (while  $\text{H}$  and  $\text{K}$  reduce another portion) whilst further on one of the  $\text{NO}_2$ -groups is replaced by oxyalkyl owing to the formation of potassium alcoholate.

An account of the researches of Dr. A. STEGER on the substitution velocity of a nitro-group in ortho- and para-dinitrobenzene by an oxyalkyl and the peculiarities observed has already been given <sup>1)</sup>.

**Chemistry.** — “*The WESTON-cadmium cell.*” By Dr. ERNST COHEN.

(Communicated by Prof. H. W. BAKHUIS ROOZEBOOM).

(Read October 27, 1900).

1. In a paper on this cell (compare this vol. p. 217—228) it was stated that cadmium amalgam with 14.3 per cent of cadmium may occur in two forms which pass into each other at  $23^\circ \text{C}$ . The existence of these forms was assumed on two grounds:

1<sup>st</sup>. From the fact that the E.M.F. of cells, constructed according to the scheme Cd-dilute solution of cadmium sulphate-Cd amalgam with 14.3 per cent of Cd, is not always the same function of the temperature but that this function may be represented by the curves shown in the subjoined figure at I, III and at II.

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<sup>1)</sup> Proc. Royal Acad. of Amsterdam. Oct. 29, 1898.

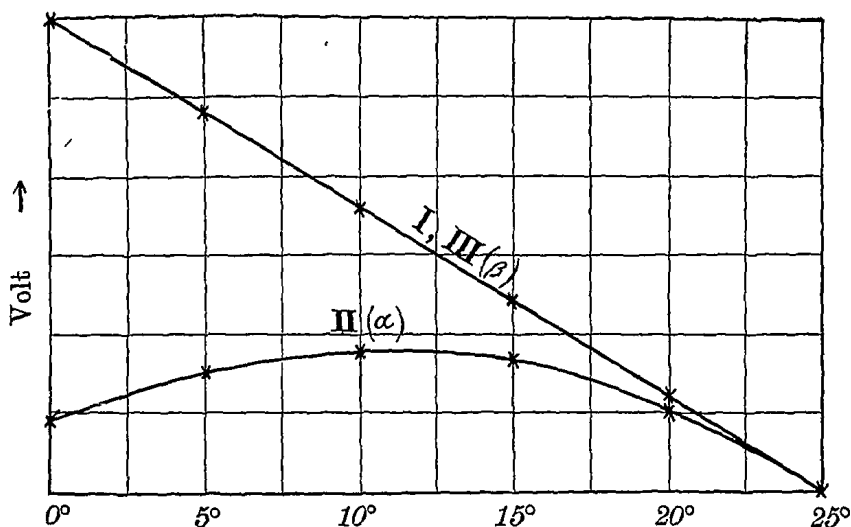


Fig. 1.

2<sup>nd</sup>. From the fact that the amalgam of the cells which follow the curve I, III showed a strong contraction in the dilatometer at 0° C.

The amalgam of the cells I, III was called by me the metastable (below 23° C.), that of the cell II the stable one.

Dr. W. BÖTTGER of Leipsic has now been so kind as to call my attention to the fact that the idea about the supposed metastability of the amalgam of the cells I, III is incorrect.

That this cannot really be correct may be shown as follows. If two cells for instance I and II of the previous paper, are linked in opposition (see fig. 2), and it is assumed that the E.M.F. of the cell with the metastable amalgam is greater than that with the stable one (at a certain temperature below 23° C.), then as in both cells the amalgam-electrode forms the positive pole, metallic cadmium would be deposited on the passing of the current, at the Cd-pole in II; *stable* cadmium amalgam would therefore pass into solution in II, whilst metallic cadmium would dissolve in I while *metastable* amalgam was being formed.

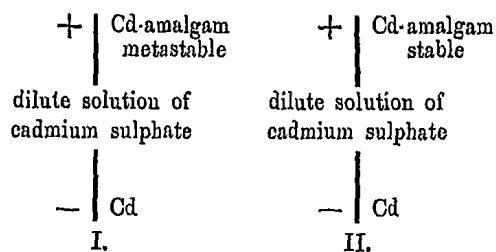


Fig. 2.

The result, therefore, would be that (below  $23^{\circ}$ ) the *metastable* system would form at the expense of the *stable* one by electrical action and this, according to known principles, is impossible.

Dr. BÖTTGER is, therefore, right when he says that the curve I, III (in fig. 1) relates to the stable and the curve II to the metastable cadmium-amalgam and that consequently according to the *electrical* measurements, the cells of JÄGER should have contained *stable* amalgam.

2. Against this result obtained by electrical means stands the result furnished by the dilatometer, which shows that the amalgam of the cells I and III, (which according to the electrical measurement ought to be stable) is not in equilibrium at  $0^{\circ}$  C. and undergoes a change accompanied by contraction.

I cannot at this moment reconcile these two apparently contrary results, but hope that the researches of Mr. H. C. BIJL on the behaviour of cadmium-amalgams will throw light on this subject.

3. Meanwhile another new contradictory matter arises, which has been duly pointed out to me by Dr. BÖTTGER.

If the cell II contains the metastable amalgam as positive pole, then a WESTON-cell constructed with this amalgam as negative electrode (IIa of the previous communication) must possess an E.M.F. which is smaller than those of the cells (Ia and IIIa), which contain the stable amalgam as negative electrode.

The measurement however, gave as result that IIa has actually a greater E.M.F. at  $0^{\circ}$  C. (1.0231 Volt) than Ia and IIIa (1.0197 Volt).

Actual repetition and extension of these investigations will only be possible when we know the circumstances during which the metastable amalgam is produced, namely when the researches on the behaviour of the cadmium-amalgams shall have been practically brought to a close.

On account of these contradictory facts I desire to postpone for the present any further conclusions as to the suitability of the WESTON-cell.

*Amsterdam*, October 1900.  
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