

SOLUBILITIES AND MOLECULAR WEIGHT DETERMINATIONS IN LIQUID CHLORINE.—By K. H. BUTLER, M. A. and D. MCINTOSH, D. SC., F. R. S. C., Dalhousie University, Halifax, N. S.

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The solubilities of compounds, their molecular weights, and the combinations formed by them in the non-polar liquid, chlorine, have been investigated by Beckmann, Karsten, Thomas and Depuis, Waentig and McIntosh, Mennie and McIntosh, and Biltz and Meinecke. We have done further work on this problem by a somewhat new method, taking as a measure of the solubility the rise in boiling point of the chlorine on the addition of a salt. A Beckmann thermometer, calibrated by means of an electrical resistance thermometer, and a modified Beckmann apparatus with the condenser kept cool by solid carbon dioxide and ether proved very satisfactory, and in the case of the soluble substances, enabled us to determine the ebullioscopic constant, i. e., the rise in boiling point for one gram molecule of solute in one thousand grams of solvent.

The following is a summary of the results obtained: Fifty-nine of the commoner salts were shown to be insoluble in liquid chlorine at its boiling point.

The reactions of ten of the elements were studied. In general our results agreed with those of previous observers, but certain new facts may be mentioned.

Sulphur was found to be non-reactive and insoluble in boiling chlorine; arsenic in lumps was inactive; silver, copper and zinc were unaffected; aluminium wire was quickly changed to the chloride, which remained undissolved in the liquid; iodine, phosphorus and tin reacted quite violently, but only in the last case was there a rise in the boiling point, showing that solution had taken place.

The ebullioscopic constants were found to be:

Chloroform	1.73
Carbon tetrachloride	1.76
Stannic chloride	1.72
Phosphorus oxychloride	1.59
Sulphur chloride	1.55
Bromine	2.83–2.70