Although no experiments were performed to demonstrate the character of this exchange, the authors feel that it must certainly be heterogeneous, probably through a mechanism involving the simultaneous transfer of hydrogens in hydrogen bonds within groups of N_2H_4–ND_3 molecules. This explanation must not be too hastily accepted, however, because the absence of any pronounced super-conductivity of the hydrogen ion in hydrazine systems,[2] and the lack of tendency for ammonia and hydrazine to form mixed crystals[3] argue against such a mechanism. The effect of small amounts of water on the formation of mixed crystals[3] suggests that the observed exchange may have been due to water catalysis, although considerable care was taken to ensure the absence of water in the above experiments. Further experiments are desirable before more definite conclusions concerning the mechanism are attempted.

These observations were made during the course of a study of exchange reactions with deuterium which was supported by a grant from the Carnegie Institution of Washington.

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[2] P. Walden and H. Hilgert, *Z. physik. Chem.*, **A165**, 241 (1933).

[3] F. Friedrichs, *Z. anorg. allgem. Chem.*, **127**, 221 (1923).

DEPARTMENT OF CHEMISTRY
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RECEIVED FEBRUARY 18, 1938

Preparation of Barium Chlorite and Solubility of Silver Chlorite

BY W. V. SMITH, K. S. PITZER AND W. M. LATIMER

Our attention has been called to the omission of two references which might properly have been included in our paper on silver chlorite.[1]

Bruni and Levi[2] prepared pure barium chlorite and Levi[3] reported values for the solubility of silver chlorite, which are in close agreement with our value at 25°.

[1] Smith, Pitzer and Latimer, THIS JOURNAL, **59**, 2640 (1937).

[2] Bruni and Levi, *Gazz. chim. ital.*, **45**, II, 169 (1915).

[3] Levi, *ibid.*, **53**, 525 (1923).

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COMMUNICATIONS TO THE EDITOR

BENTONITE AS AN ADSORBENT IN THE PURIFICATION OF INVERTASE[1]

Sir:

In the course of investigations on invertase we have developed, in the preparation of this enzyme, certain procedures which may be of value not only in connection with invertase but also in regard to other problems in biochemistry. Bentonite, a colloidal clay already well-known commercially, has been found to be an excellent adsorbent for invertase. Bentonite can be used, without preliminary treatment, in the undiluted autolysates from yeast. Both adsorption and elution can be carried out under conditions more favorable for the stability of invertase than those generally used with other clays. The optimal *p*H for adsorption is 4.1–4.3 while an acetate or phosphate solution of *p*H 5.3 or greater produces satisfactory elution. The amount of bentonite required for complete adsorption is relatively small and the five different samples of bentonite so far investigated have all proved excellent adsorbents for invertase, yielding preparations of similar time values.

Invertase solutions with time values of 0.20–0.27 minute as expressed in the customary units[2] have been obtained by dialysis following a single bentonite treatment of various types of autolysates from bakers' yeast. Similar solutions have been prepared from unenriched brewers' yeast by a slight modification involving fractional adsorption on bentonite with 10–20% adsorption and loss in the first fraction. From enriched brewers' yeast (*i. e.*, yeast which has been allowed to ferment a sucrose solution) preparations have been obtained with time values of 0.15–0.18 minute. The invertase solutions thus prepared do not lose activity during dialysis or subsequent storage over a period of several months in the refrigerator.

The following describes a typical procedure. A fractional autolysate of bakers' yeast was prepared by treating 430 g. of yeast (time value, 34.3) at 30° with 43 cc. of ether, adding 43 cc. of toluene,

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[1] Publication authorized by the Surgeon General, U. S. Public Health Service.

[2] C. Oppenheimer, "Die Fermente und ihre Wirkungen," fifth edition, 1928, Vol. III, pp. 770–774.