difference of only 0.1 to 0.3 mv. in the calculated E^0 values.

In conclusion, the E^0 for the Ag_2O/Ag electrode in alkaline solutions determined by direct measurement against the hydrogen electrode is somewhat lower than the E^0 value determined by indirect methods. An analysis of the experimental procedure shows that this difference is larger than the experimental errors associated with the method used in this work.

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Densities of Some Salt Mixtures

$LiNO_3$-$LiClO_4$, KNO_3-$Ca(NO_3)_2$, KNO_3-$Sr(NO_3)_2$, and KNO_3-$Ba(NO_3)_2$

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DENSITY DATA for molten salt mixtures are required for the computation of molar volumes which enter into the evaluation of many other physical properties.

EXPERIMENTAL PROCEDURES

The apparatus and general experimental procedures have been described in detail (*1*).

RESULTS AND DISCUSSION

The density data were fitted by the method of least squares to the equation $\rho = \alpha - \beta t$, where ρ is the density, and α and β are functions of composition, but not temperature. The results are given in Table I, which lists the composition in terms of the mole per cent of the specified nitrate, the constants α and β in the density equation, the standard deviation for the least squares fit, and the experimental temperature range. Each density equation is based on data taken at six to nine temperatures. The density equations for $LiNO_3$ and KNO_3 as previously measured by the authors (*1*) are included in Table I for convenience.

Table I. Density Equations

Compn., Mole %	$\rho = \alpha - \beta t$ α, g./cc.	$\beta \times 10^3$, g./cc./° C.	Std. Dev. $\times 10^3$, G./Cc.	Exptl. Temp. Range, ° C.
KNO_3	KNO_3-$Ca(NO_3)_2$ System			
100.0	2.110	0.733	0.8	346–505
90.0	2.132	0.709	0.3	396–469
80.0	2.172	0.735	1.1	296–470
70.0	2.192	0.713	0.5	231–449
KNO_3	KNO_3-$Sr(NO_3)_2$ System			
90.0	2.218	0.740	0.5	361–501
80.0	2.316	0.737	1.4	348–497
70.0	2.403	0.721	0.2	421–452
KNO_3	$KNO_3Ba(NO_3)_2$ System			
90.0	2.305	0.773	0.3	324–520
80.0	2.475	0.795	0.8	377–518
70.0	2.629	0.805	0.4	438–517
$LiNO_3$	$LiNO_3LiClO_4$ System			
100.0	1.922	0.556	0.5	276–420
75.0	2.014	0.610	0.4	240–357
53.5	2.088	0.629	0.4	198–347
25.0	2.134	0.629	0.4	225–336
0	2.170	0.612	0.6	261–371

Molar volume calculations based on density equations show that the mixtures described here possess the property of volumetric additivity to within a very small error. Hence, this property may be used for precise interpolation of density at compositions intermediate to those which were measured.

The additivity of volumes of liquid $LiClO_4$-$LiNO_3$ mixtures was checked over the temperature range from the melting point of the eutectic (53.5 mole % $LiClO_4$) at about 172° up to 300° C. by extrapolating the density equations of the pure constituents into the supercooled liquid region as required. The deviations from volumetric additivity were negative and decreased with increasing temperature. The greatest deviations were for the eutectic mixture which was additive to within 0.4% at 172° C. and to within 0.2% at 300° C.

In the case of mixtures of KNO_3 and alkaline earth nitrates at 450° C., the volumes of the 10 and 20 mole % KNO_3 mixtures deviated from the additive volumes of pure KNO_3 and 30 mole % KNO_3, regarded as components, by about 0.2% for the KNO_3-$Sr(NO_3)_2$ system and by less than 0.1% for the KNO_3-$Ca(NO_3)_2$ and KNO_3-$Ba(NO_3)_2$ systems. These deviations are within experimental error.

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