

is just as serious, however, for the other Na-based systems studied by McAlister. His results for  $(\Omega^{-1}d\Omega/dc_1)$  and  $(K_S^{-1}dK_S/dc_1)$  in very dilute solutions, together with some results for Na-K reported by Abowitz and Gordon (1962), are listed in columns (4) and (7) of the table. The figures in column (5) are rough estimates for  $(\Omega_1^2 z_0^2 K_1 / \Omega_0^2 z_1^2 K_0)$ , derived, except in the case of Na-K and Na-Hg, by using for  $\Omega_1$  and  $K_1$  the molar volume and isothermal bulk modulus of the pure solute just above its melting point. The figures in column (6), derived from eqn. (12), are in very poor agreement with the experimental results in (7), except perhaps in the case of Na-K. The experimental values for  $(K^{-1}dK/dc_1)$  are much less than expected and curiously insensitive to the valency of the solute.

(1) Solute	(2) $T^\circ\text{C}$	(3) $\left(\frac{z_1 - z_0}{z_0}\right)$	(4) $\left(\frac{1}{\Omega} \frac{d\Omega}{dc_1}\right)_{c_1 \rightarrow 0}$	(5) $\left(\frac{\Omega_1^2 z_0^2 K_1}{\Omega_0^2 z_1^2 K_0}\right)$	(6)   (7)	
					$\left(\frac{1}{K} \frac{dK}{dc_1}\right)_{c_1 \rightarrow 0}$	
					Eqn. (12)	Expt.
K	100	0	0.84	1.77	-0.9	-1.3
Au	300	0	-1.40	(2.1)	(3.9)	1.26
Cd	300	1	-0.96	0.52	3.5	1.24
Hg	300	1	-1.06	0.31	3.4	1.36
In	300	2	-1.00	0.33	5.3	1.22
Sn	300	3	-1.31	0.23	7.8	1.41
Pb	300	3	-1.50	0.26	8.3	1.36

The weakest link in the theoretical argument is probably the assumption of linear screening; a polyvalent ion transplanted into a matrix of pure Na may well represent too strong a perturbation, so far as the conduction electrons are concerned, for the screening to be even approximately linear. In an extreme case it might retain some of its valence electrons in localized states around itself, and hence behave as though its valency were less than  $z_1$ . Quite good agreement between theory and experiment could be achieved if one were prepared, in the context of the table, to replace  $z_1$  by unity for all the solute elements listed. In most metallic alloy systems, however, the assumption of localized states is usually thought to be inconsistent with the observed behaviour of transport properties such as the Hall coefficient.

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