

TABLE 2—CORRESPONDING CONDUCTANCES OF CsClO₄, AgClO₄, NH₄ClO₄, AgNO₃ IN DIMETHYLFORMAMIDE AT 25°C
(ohm⁻¹ cm⁻² mole⁻¹)

	Concentration (M)									
	0.0001	0.0002	0.0003	0.0004	0.0006	0.0008	0.0010	0.0015	0.0019	
LiClO ₄ (exp)	75.76	74.98	74.61		73.69		72.61			
RbClO ₄	82.71	82.08	81.80		80.76		79.59			
CsClO ₄ *	84.67	84.13	83.90							
	(84.6698)	(84.0509)	(83.5532)		(82.7226)		(81.5276)			
AgClO ₄ (exp)†	85.83	85.02	84.548		83.65					
	(85.8298)	(85.2174)	(84.97772)		(83.8842)		(82.6744)			
NH ₄ ClO ₄ (exp)‡	89.00		86.69							
	(88.9997)	(88.4053)	(88.2055)		(87.0586)		(85.8084)			
KI (exp)				79.69		78.48		77.19	76.43	
KBr				80.74		79.59			77.16	
AgNO ₃ (exp)§				77.06		70.67		64.02		
				(77.0601)		(75.7349)		(74.16)		

Calc. values in parentheses assuming * $r=1.2776$; † $r=1.4419$; ‡ $r=1.8909$; § $r=2.5047$.

 TABLE 3 — CORRESPONDING CONDUCTANCE OF KClO₄ IN AQUEOUS MEDIA AT 25°C (ohm⁻¹ cm⁻² mole⁻¹)

	Concentration (M)									
	0.0005	0.001	0.002	0.005	0.010	0.020	0.050	0.070	0.100	
LiClO ₄ (exp)	104.18	103.44	102.46	100.57	98.61	96.18	92.20	90.50	88.56	
NaClO ₄	115.64	114.87	113.80	111.75	109.59	106.96	102.40	100.52	98.43	
KClO ₄ (exp)*	138.76	137.87	136.62	134.16	131.46	127.92	121.62	118.79	115.20	
	(138.75)	(137.92)	(136.67)	(134.30)	(131.74)	(128.64)	(122.97)	(120.73)	118.3417	

*Calculated values in parentheses assuming $r=3.0174$.

ductance study of AgNO₃ in dimethylformamide has been done in the concentration range of 0.0004 to 0.0019M by choosing KI and KBr as the subscripts 1 and 2. Finally theoretical values of conductance have been calculated in the case of KClO₄ (Table 3) in the conc. range of 0.0005 to 0.100M. The results are in good agreement with the experimental values. Theoretical values of Λ_0 and Walden product $\Lambda_0\eta$ obtained for these salts are shown in Table 1.

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Studies on the Cell Ni|Ni-Soap(s), K-Soap, Cu-Soap(s)|Cu

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The e.m.f., temperature coefficient of e.m.f. and the thermodynamic parameters of the cell reaction have been computed for the cells of the type Ni|Ni-soap(s), K-soap, Cu-soap(s)|Cu. The soaps have been derived from lauric, myristic, palmitic and stearic acids. The cell's reaction is accompanied by decrease in enthalpy as well as entropy. The cell e.m.f. is also found to be independent of concentration of potassium soap solution.

IN continuation of our earlier work¹⁻⁵ on metal-metal soap electrode system, the e.m.f. of the cell of the type (A) has been evaluated.

Ni|Ni-soap(s), K-soap, Cu-soap(s)|Cu (A)

Potassium salts of lauric (C₁₁), myristic (C₁₃), palmitic (C₁₅) and stearic (C₁₇) acids were prepared from reagent grade (BDH) acids and crystallized from ethanol.

Nickel and copper soaps were prepared by a direct metathesis reaction at 50-55° from the corresponding potassium soaps and aqueous solution of nickel or copper sulphate. The precipitated soaps were washed with distilled water and then with ethanol to remove free precipitant. The soaps gave satisfactory elemental analysis.

Nickel electrodes were prepared by depositing nickel on platinum wires by the electrolysis of a solution containing nickel sulphate (15%), boric acid (1%) and sodium chloride (0.6%). The electrodes were connected to a 4 V battery and a current of 20 mamp was passed for about 2 hr. Copper electrodes were prepared by depositing copper on platinum wires by the electrolysis of a solution containing CuSO₄ (8%) and H₂SO₄ (4.6%). The electrodes were connected to a 2 V battery and a current of 15 mamp was passed for 4 hr.

A Cambridge portable potentiometer was used for e.m.f. measurements of the cell of the type (A) at different temperatures. The cell vessel employed was of H type. The two limbs of the cell were provided with nickel and copper electrodes. The cell contained aqueous solution of potassium soap saturated with nickel and copper soaps. Some solid metal soaps were always added to the cell to make certain that potassium soap solution was saturated with respect to metal soaps.

TABLE 1 — TEMPERATURE COEFFICIENT OF E.M.F. AND ΔG , ΔH AND ΔS FOR THE CELL REACTIONS

Cell reaction	e.m.f. at 303°K (V)	dE/dT (V deg ⁻¹)	$\Delta G_{303^\circ K}$ (cal.)	$-\Delta H_{303^\circ K}$ (cal.)	$\Delta S_{303^\circ K}$ (cal. deg ⁻¹)
$Ni + (C_{11}H_{23}COO)_2Cu \rightleftharpoons (C_{11}H_{23}COO)_2Ni + Cu$	0.1242	-0.000826	-5728	-17268	-38.11
$Ni + (C_{13}H_{27}COO)_2Cu \rightleftharpoons (C_{13}H_{27}COO)_2Ni + Cu$	0.1287	-0.00075	-5936	-16416	-34.59
$Ni + (C_{15}H_{31}COO)_2Cu \rightleftharpoons (C_{15}H_{31}COO)_2Ni + Cu$	0.1315	-0.0007	-6064	-15845	-32.28
$Ni + (C_{17}H_{35}COO)_2Cu \rightleftharpoons (C_{17}H_{35}COO)_2Ni + Cu$	0.1343	-0.00066	-6194	-15415	-30.44

TABLE 2 — E.M.F. OF THE CELL OF THE TYPE (A)

Pot. soap ($C \times 10^3$) M	Temp. (°C)	e.m.f. (V)	dE/dT (V/deg)	Mean dE/dT (V/deg)
SOAP DERIVED FROM LAURIC ACID				
5	25	0.1285		
8	25	0.1285		
10	25	0.1285		
10	30	0.1242	-0.00086	
10	40	0.1162	-0.00080	-0.000826
10	45	0.1120	-0.00082	
SOAP DERIVED FROM MYRISTIC ACID				
1	25	0.1325		
2.5	25	0.1325		
5	25	0.1325		
5	30	0.1287	-0.00076	
5	35	0.1250	-0.00074	
5	40	0.1212	-0.00076	-0.00075
5	45	0.1175	-0.00074	
SOAP DERIVED FROM PALMITIC ACID				
1.0	25	0.1350		
1.5	25	0.1350		
2.5	25	0.1350		
2.5	30	0.1315	-0.00070	
2.5	35	0.1280	-0.00070	
2.5	40	0.1246	-0.00068	-0.0007
2.5	45	0.1210	-0.00072	
SOAP DERIVED FROM STEARIC ACID				
0.5	25	0.1375		
0.7	25	0.1375		
0.8	25	0.1375		
0.8	30	0.1343	-0.00064	
0.8	35	0.1310	-0.00066	
0.8	40	0.1276	-0.00068	-0.00066
0.8	45	0.1243	-0.00066	

The e.m.f. values recorded at different temperatures are given in Table 2.

The reaction taking place in the cell is



where D stands for laurate, myristate, palmitate or stearate ion.

Both the electrodes involved in the cell under consideration are reversible with respect to the detergent anion. The e.m.f. of the cells should be independent of the concentration of potassium soap and should be equal to algebraic difference of standard reduction or oxidation potential of electrodes. The concentration ranges of potassium soaps investigated were from 1×10^{-2} to 5×10^{-3} , 5×10^{-3} to 1×10^{-3} , 2.5×10^{-3} to 1×10^{-3} and 8×10^{-4} to $5 \times 10^{-4} M$ for potassium laurate, myristate, palmi-

tate and stearate respectively. These concentrations of potassium soaps are just below the critical micelle concentration (cmc) values¹. It is evident from Table 2 that the e.m.f. of the cells are independent of the concentration of potassium soap solution.

The following equations have been used for calculating ΔG , ΔH and ΔS at 303°K:

$$\Delta G = -nEF$$

$$\Delta S = nF (dE/dT)_p$$

$$\Delta H = -nEF + nFT (dE/dT)_p$$

The values of the e.m.f. of the cells at 303°K, the temperature coefficient of e.m.f. and the values of ΔG , ΔH and ΔS for the cell reactions are given in Table 1.

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Mn(II), Fe(II), Co(II), Ni(II), Cu(II), Zn(II), Pd(II), Cd(II) & UO₂(II) Chelates of Schiff Bases Derived from *o*-Aminobenzenesulphonic Acid & 2-Aminoethanesulphonic Acid & 2-Hydroxy-1-naphthaldehyde

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N - (2 - Hydroxy - 1 - naphthalidene)orthanilic acid (H₂NO) and N-(2-hydroxy-1-naphthalidene)taurine (H₂NT), the two structurally similar Schiff bases, form solid chelates with Mn(II), Fe(II), Co(II), Ni(II), Cu(II), Zn(II), Pd(II), Cd(II) and UO₂(II). Elemental analyses, molecular weight, magnetic moment values and electronic spectral data indicate nearly octahedral stereochemistry for Mn(II), Fe(II), Co(II), Ni(II) and UO₂(II) chelates, whereas Cu(II) chelates display a tetragonal configuration. Zn(II) and Cd(II) chelates are tetrahedral in structure and the Pd(II) chelate possesses square-planar geometry.

A PERUSAL of the literature¹ reveals that no systematic studies have been carried out on Schiff bases derived from *o*-aminobenzenesulphonic