

**Preparation and Conductivity Measurements
of some Metal 9, 10-
Dihydroxyoctadecanoates.**

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Abstract:

The preparation of 9,10-dihydroxyoctadecanoic acid is carried out using oleic and elaidic acids as reported by Swern and Co-workers. Characterization of the acids is done by taking the melting points and the infrared spectra. The 9,10-dihydroxyoctadecanoic acid obtained from Oleic acid is used in preparing lead(II), Zinc(II), Mercury(II) and Cadmium(II) 9,10-dihydroxyoctadecanoates. The identity of lead(II) and Zinc(II) 9,10-dihydroxyoctadecanoates is established by the results of the melting points, elemental analysis, IR and NMR spectra.

The electrical conductances of the pure soap and some binary mixtures with the corresponding metal Octadecanoates are measured. It is found that while the plots of logarithm of conductivity against inverse temperature of the lead(II) 9,10-dihydroxyoctadecanoate ($\text{Pb(OH)}_2\text{A}_2$) show a maximum, that of Zinc(II)9,10-dihydroxyoctadecanoate($\text{Zn(OH)}_2\text{A}_2$) and its binary mixtures Zinc(II)octadecanoate/Zinc(II)9,10-dihydroxyoctadecanoate ($\text{ZnA}_2/\text{Zn(OH)}_2\text{A}_2$) are linear. However, for the binary mixtures of lead(II)octadecanoate/lead(II)9,10-dihydroxyoctadecanoate ($\text{pbA}_2/\text{Pb(OH)}_2\text{A}_2$) at low mole fractions ($X_{\text{Pb(OH)}_2\text{A}_2} < 0.02$) non-linear graph characteristics of the behaviour of lead(II) carboxylate systems are observed while for high mole fractions ($X_{\text{Pb(OH)}_2\text{A}_2} > 0.03$) the shape of the curves resemble that of pure $\text{Pb(OH)}_2\text{A}_2$, the observance of a maximum in the system is interpreted in terms of the interaction of lead ions with the hydroxyl groups.

Plots of molar volume against temperature for $\text{PbA}_2/\text{Pb(OH)}_2\text{A}_2$ show curvature in support of such interactions, suggesting deviations from ideal behaviour of the liquid systems. The activation energies for conduction and dissociation ($\Delta H_{\text{K}}^{\mu} + \Delta^{\text{H}}/3$) for the pure lead(II) and Zinc(II)9,10-dihydroxyoctadecanoates and their mixtures are obtained. For lead(II) octadecanoate/ lead(II)9,10-dihydroxyoctadecanoate at low mole fraction the enthalpy decreases steadily up to a point with increase in mole fraction and then increases. However, for the zinc soaps and its mixtures the enthalpy terms are found to be fairly constant with increasing mole fraction even when the actual conductivity falls.

Keywords: Conductivity/ oleic acid/ elaidic acid/ enthalpy terms

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