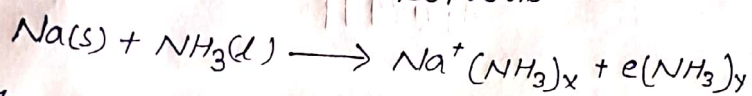


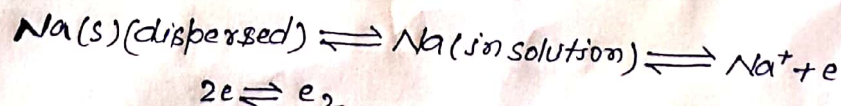
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## SOLUTIONS OF ALKALI METALS IN LIQUID AMMONIA

All the alkali metals are highly soluble in liquid ammonia giving deep blue colour. per 100g of  $\text{NH}_3$ , The solubilities are Li 10g; 10g Na, 25g and K, 49g. The dissolution of the alkali metal is accompanied by its dissociation into the metal ions and the electrons. The metal ion and the electrons then get associated with ammonia solvent molecules. Electrons associated with the solvent are known as solvated electrons.



The alkali metal solutions in liquid ammonia are highly conducting and behave almost as metals. Their specific conductivities are almost the same, because the anion i.e., solvated electron in all the cases is the same. The small difference in the conductivity is due to the nature of the metal itself. The solution of alkali metals in liquid ammonia is blue in colour due to the presence of solvated electrons and, therefore, the solutions are also paramagnetic. With increasing concentration there is a decrease in paramagnetism suggesting that the electron can get associated to form diamagnetic electron pairs. Although there may be other equilibria also:



On increasing the concentration above 3M, the colour of the solution changes to copper bronze having metallic luster because the metal ions form clusters. Except lithium, other alkali metals can be recovered unchanged from solution.

Lithium in ammonia solution forms a complex of the type  $[\text{Li}(\text{NH}_3)_4]^+$ .

The blue solutions of alkali metals are moderately stable at temperatures where ammonia is still a liquid, but the reaction to give amide,



can occur photochemically and is catalysed by transition metal salts. The alkali metal solutions in liquid ammonia are powerful reducing agents and are used for this purpose in inorganic and organic reactions.

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