1. NaCl

Fig 11 represents the phase diagram of NaCl + H2O system. The diagram shows areas that represent a particular mixture of salt of NaCl and water at a given temperature. The point at a temperature of 253K is called eutectic point, which is the lowest temperature at which a liquid phase is stable at a given pressure. It's when a solid solute, a solid solvent, and a liquid mixture all exist in the same phase. The eutectic point is also known as the eutectic temperature and is the lowest possible melting point over all of the mixing ratios of the constituents. The temperature range of 253K to 272K represents the NaCl.2H2O + liquid system which means that you have a rock salt crystal with water molecules as a kind of dissolved impurity (2H2O molecules occupying the place of one NaCl unit), whereas the temperature this represents the NaCl + liquid system. The complete solid – liquid equilibrium data is traced almost exactly with experimental values for both N=3 and N=4 lines.

1. LiCl

Fig 12 represents the phase diagram for LiCl + H2O system. Besides anhydrous LiCl, there exist four solid lithium chloride hydrates, with respectively 1, 2, 3, and 5 water molecules. These salts are extremely soluble in water. For example, the solubility of the monohydrate LiCl.H2O is about 20 mol/kg of H2O in pure water at 273 K. At the eutectic temperature of the LiCl + H2O system (199 K), which is one of the lowest of all alkali + water or alkaline earth + water systems, the stable solid is the pentahydrate LiCl.5H2O. Despite this very low temperature, the concentration of the saturated solutions is very high, 24% volume fraction of salt at the eutectic. The calculated liquidus in the LiCl + H2O system showed good agreement with the experimental results for both N=3 and N=4 lines.

1. CaCl2

Fig 13 represents the phase diagram for CaCl2 + H2O system. Phases at equilibrium for the chemical system CaCl2 + H2O are shown as a function of volume fraction of CaCl2 salt and temperature. There are three solid CaCl2 hydrates of 2, 4 and 6. In which CaCl2.6H2O and CaCl2.2H2O occur naturally and have mineral names which are called as antarctictites and sinjarites respectively. The eutectic point of this system is around 223.5K. Till the volume fraction of 0.4, our model showed an excellent agreement with the experimental data for both N=3 and N=4 lines, above with N=4 line tried to trace almost with the experimental data where N=3 line showed a slight deviation till volume fraction of 0.56.

1. Li2SO4

Fig 14 represents the phase diagram of Li2SO4 + H2O system. This system depicted a simple curve. There is a slight increase in the solubility of Li2SO4 till the eutectic point of around 250K. Here there exist only one form of hydrate salt which is Li2SO4.H2O. Our model made an excellent argument in terms of tracing the experimental values with our model values for both N=3 and N=4.

1. MgSO4

Fig 15 represents the phase diagram of MgSO4 + H2O system. The phase diagram for the MgSO4 + H2O system is more complex, because there are more than three phases that can exist. In addition to the solid, liquid, and gas phases, there are also several hydrate phases. Those different hydrate include a count of 1, 4, 5, 6, 7 and 11 molecules of H2O. The phase diagram for the MgSO4 + H2O system is useful for understanding the behaviour of this system in different conditions. For example, the diagram can be used to determine the conditions at which magnesium sulphate heptahydrate will form or decompose. This information can be used in a variety of applications, such as the production of magnesium sulphate and the desalination of water. Our model gave an excellent result of aligning with the experimental values for both N=3 and N=4. There is a slight deviation from the experimental values in between the volume fraction of 0.0036 till 0.011.