in a large increase in solubility for some solvents and only a slight change for others.

In **Table 4** and **Figure 15,** compare the effect of temperature on the solubilities of potassium nitrate, KNO_3, and sodium chloride, NaCl. About 14 g of potassium nitrate will dissolve in 100. g of water at 0.°C. The solubility of potassium nitrate increases by more than 150 g KNO_3 per 100. g H_2O when the temperature is raised to 80.°C. Under similar circumstances, the solubility of sodium chloride increases by only about 2 g NaCl per 100. g H_2O. In some cases, solubility of a solid *decreases* with an increase in temperature. For example, between 0.°C and 60.°C the solubility of cerium sulfate, $Ce_2(SO_4)_3$, decreases by about 17 g/100 g.

Enthalpies of Solution

The formation of a solution is accompanied by an energy change. If you dissolve some potassium iodide, KI, in water, you will find that the outside of the container feels cold to the touch. But if you dissolve some sodium hydroxide, NaOH, in the same way, the outside of the container feels hot. The formation of a solid-liquid solution can apparently either absorb energy (KI in water) or release energy as heat (NaOH in water).

During the formation of a solution, solvent and solute particles experience changes in the forces attracting them to other particles. Before dissolving begins, solvent molecules are held together by intermolecular forces (solvent-solvent attraction). In the solute, molecules are held together by intermolecular forces (solute-solute attraction). Energy is required to separate solute molecules and solvent molecules from their neighbors. *A solute particle that is surrounded by solvent molecules,* as shown by the model in **Figure 9,** *is said to be* **solvated.**

Solution formation can be pictured as the result of the three interactions summarized in **Figure 16.**

FIGURE 16 The graph shows the changes in the enthalpy that occur during the formation of a solution. How would the graph differ for a system with an endothermic heat of solution?