

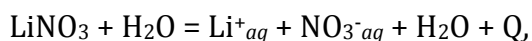
## Answer on Question #60384 - Chemistry - General Chemistry

Question:

When a 7.10 g sample of lithium nitrate dissolves in 28.00 g of water in a coffee-cup calorimeter, the temperature rose from 25.20 °C to 27.22 °C. Assume that the solution has the same specific heat as liquid water, i.e., 4.184 J/g·°C. Give the equation for the dissolution of solid lithium nitrate in water.

Solution:

1) Write down the generic equation:



Where Q – is heat of dissolution.

2) We have to find the amount of heat per 1 mole of compound.

The total amount of heat in experiment:

$$Q_{\text{total}} = \Delta T (\text{temperature change}) * m_{\text{solution}} (\text{mass of solution}) * c (\text{specific heat}).$$

$$Q_{\text{total}} = (27.22^\circ\text{C} - 25.20^\circ\text{C}) * (7.10\text{g} + 28.00\text{g}) * 4.184 \text{ J/g}^\circ\text{C} = 296.65 \text{ J}.$$

The heat of dissolution (per mole)

$$Q = (Q_{\text{total}} / m (\text{mass of compound})) * M (\text{molar mass of compound}).$$

$$M_{\text{LiNO}_3} = 6.94 + 14.01 + 3 * (16.00) = 68.95 \text{ g/mol}$$

$$Q = (296.65 \text{ J} / 7.10 \text{ g}) * 68.95 \text{ g/mol} = 2880.85 \text{ J/mol} (2.88 \text{ kJ/mol})$$

**Answer:**

