**Answer on Question #55344 - Chemistry - General chemistry**

**Question:**

Julie is conducting an experiment where she placed 30.0 mL of water in a calorimeter at 10.0 °C. Then, 2.5 g of A (molar mass = 48.0 g/mol), also at 10.0°C, is added to the water in the calorimeter and the temperature of the solution increases to 29.0 °C. The following reaction is produced:
a.) What is the enthalpy of the reaction (ΔH°rxn), in kJ/mol?

**Solution:**

$n = m/M_w = 2.5\ g/48.0\ g\ mol^{-1} = 0.052\ mol$

$C_{H2O} = (C_{10C} + C_{30C})/2 = (4.178 + 4.192)/2 = 4.185\ (J\ g^{-1}\ K^{-1})$

$Q = m_{H2O} \times C_{H2O} \times \Delta T = \rho_{H2O} \times V_{H2O} \times C_{H2O} \times \Delta T = 1.00\ g\ mL^{-1} \times 30.0\ mL \times 4.185\ J\ g^{-1}\ K^{-1} \times (29.0\ °C - 10.0\ °C) = 2385.45\ J$

$\Delta H = Q/n = Q \times M_w/m = 2385.45\ J \times 48.0\ g\ mol^{-1}/2.5\ g = 45800\ J/mol = 45.8\ kJ/mol$

**Answer 45.8 kJ/mol**