

## Answer on Question #56149 – Chemistry - General Chemistry

### Question:

You wish to prepare a hot pack that will generate a temperature of 78°C (172.5 F) if your hot pack initially contains 150 ml of water at 22°C what mass of CaCl<sub>2</sub> will you need to include in your hot pack? Assume the specific heat of the resulting solution is 1.0 cal/g(C) .

### Answer:

Heat of the reaction can be calculated as:

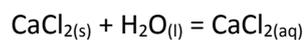
$$q = SH \cdot m \cdot \Delta T$$

where SH – specific heat of the reaction solution, cal/g(C) ;

$\Delta T$  - change in temperature (in °C);

m – mass of the solution, g.

$$q = 1.0 \cdot (150 + x) \cdot (78 - 22)$$



$$\Delta H_{\text{soln}} = -19.5 \text{ kcal/mol}$$

$$-q_{\text{reaction}} = q_{\text{calorimeter}}$$

$$19500 = 1.0 \cdot (150 + x) \cdot (78 - 22)$$

$$x = 19500 / 56 - 150$$

$$x = 198 \text{ g}$$