Name(s): _____ ***Chem 121 / Dr. Rusay***

Understanding Solubility: Preparing Graphs and Spreadsheets with Excel

***Worksheet Questions**:*

1) Use the linear curve-fit equations that you generated to calculate values of ΔH^{o}_{sol} for $Na_2SO_4{:}10H_2O$, Na_2SO_4, $K_2Cr_2O_7$, NaCl, and Li_2CO_3. Enter your results in the Table below.

Calculated Standard Enthalpies of Solution		
Compound	**Δ H, curve-fit (kJ/mole)**	
Li_2CO_3		
$K_2Cr_2O_7$		
NaCl		
Na_2SO_4		
$Na_2SO_4{:}10H_2O$		

2) Using the calculated enthalpies of solution above, indicate if the solution process is endothermic or exothermic, and what are the effects of increasing temperature for the respective salts.

Formula	**Molar Mass (g/mol)**	**Solution** (exothermic or endothermic)	**Solubility as T increases** (increases or decreases)
Li_2CO_3	73.89		
$K_2Cr_2O_7$	294.19		
NaCl	58.45		
Na_2SO_4	142.06		
$Na_2SO_4{:}10\ H_2O$	322.19		

3) Davis, California is an environmentally progressive small city. Architects have used one of the above salts in the design of passive solar homes. Identify the most likely salt and calculate how many kilograms of salt would be needed to heat a 2,000 ft^2 home based on the heat (enthalpy) of solution? Show your calculation. The architect used PG&E estimates in his calculation that 60,000 Btu of energy would be needed. (Assume 100% of the salt solution's enthalpy is used, and 1 Btu = 1.055 kJ) Show your calculation and briefly explain how you think the architects would incorporate the salt solution into their designs. *(The actual application uses the solid salt, which melts at 32.4°C with ΔH = +200 kJ/mol, rather than the solution.)*