(2) 1. What chemical is produced in larger volume (both worldwide and the U.S.) than any other chemical?

   sulfuric acid, $\text{H}_2\text{SO}_4$

2. Consider the following reaction:

   \[ \text{Ni} + 4 \text{CO} \rightleftharpoons \text{Ni(CO)}_4 \]

(2) a. If $\Delta H^\circ$ for this reaction is $-160.82 \text{kJ}$ and $\Delta S^\circ$ for this reaction is $-409.51 \text{J/K}$, would this reaction be most favored to proceed as written at high temperature or at low temperature?

   \[ \Delta G = \Delta H - T \Delta S \]

   Reaction is favored (spontaneous) for a negative $\Delta G$.

   $\Delta G$ is negative at low temperature.

(6) b. At what temperature will the reaction shift from spontaneous to non-spontaneous?

   \[ \Delta G = \Delta H - T \Delta S \]

   \[ @ \Delta G = 0 \]

   \[ T \Delta S = \Delta H \]

   \[ T = \frac{\Delta H}{\Delta S} = \frac{-160.82 \text{kJ}}{-0.40951 \text{kJ/K}} = 392.7 \text{K} \]

   or $120^\circ \text{C}$