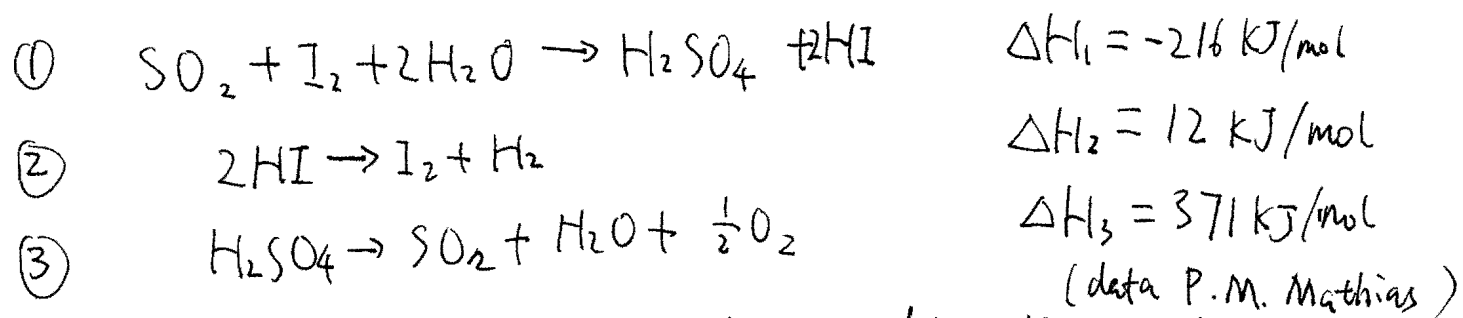


Sulfur - iodine process.



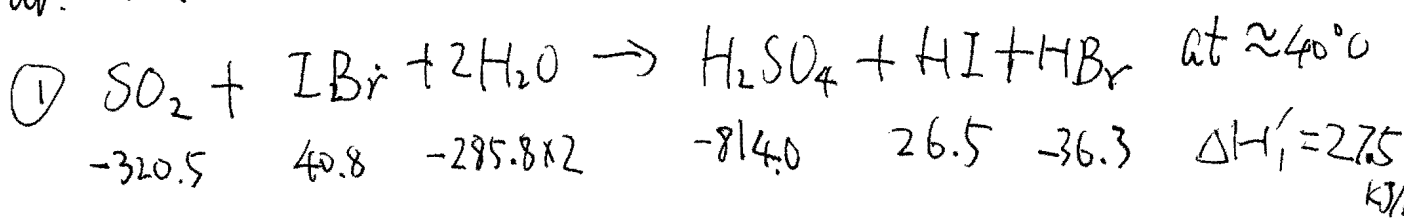
Note the sum of ① ② ③ $\Rightarrow H_2O \rightarrow \frac{1}{2}O_2 + H_2$ Aspen Tech.
 $\Delta H = 167 \text{ kJ/mol}$. \sim roughly $\frac{1}{2}$ mol of H_2O enthalpy
 at high temperature and pressure. due to vaporization and work done
 at $125^\circ C$

The efficiency is given by (w/o considering heat exchanger)

$$\eta = \frac{\Delta H}{383(\Delta H_2 + \Delta H_3)} = \frac{\text{gain in water split enthalpy.}}{\text{total heat input}}$$

$$= \frac{167}{383} = 43.6\%$$

1b. sulfur - iodine bromide:



~~Solvation heat of HI $\approx 80 \text{ kJ/mol}$~~
 Ideally, consider ~~HBr~~ is inert in the cycle.
 ~~$\Delta H_1 = -52.5 \text{ kJ/mol}$~~ $\Delta H_1 + \Delta H_2 + \Delta H_3 = 400 \text{ kJ/mol}$

The S-IBr efficiency is given by $\eta = \frac{\Delta H}{\Delta H_2 + \Delta H_3} = \frac{285}{400}$
 $= 70\%$

2. Problems: ① phase isolation ② HBr is wasted ③ HBr has "dead" weight.