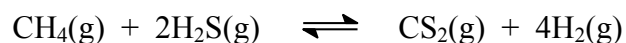


- Methane, CH_4 , reacts with hydrogen sulfide, H_2S , according to the following equilibrium:



In an experiment 1.00 mol of CH_4 , 2.00 mol of H_2S , 1.00 mol of CS_2 and 2.00 mol of H_2 are mixed in a 250 mL vessel at 960 °C. At this temperature, $K_c = 0.034$ (based on a standard state of 1 mol L^{-1}).

Calculate the reaction quotient, Q , and hence predict in which direction the reaction will proceed to reach equilibrium? Explain your answer.

Marks
5

Show that the system is at equilibrium when $[\text{CH}_4(\text{g})] = 5.56 \text{ M}$.