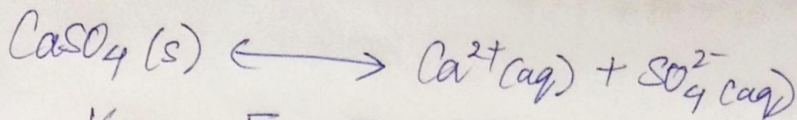


Question 7-72:

What is the minimum volume of water required to dissolve 1g of Calcium sulphate at 298 K? (For Calcium sulphate, K_{sp} is 9.1×10^{-6}).

Answer 7-72:



$$K_{sp} = [\text{Ca}^{2+}][\text{SO}_4^{2-}]$$

Let the solubility of CaSO_4 be s .

$$\text{Then, } K_{sp} = s^2$$

$$9.1 \times 10^{-6} = s^2$$

$$s = 3.02 \times 10^{-3} \text{ mol/L}$$

Molecular mass of $\text{CaSO}_4 = 136 \text{ g/mol}$.

Solubility of CaSO_4 in gram/L.

$$= 3.02 \times 10^{-3} \times 136$$

$$= 0.41 \text{ g/L}$$

This means that we need 1L of water to dissolve 0.41g of CaSO_4 .

Therefore, to dissolve 1g of CaSO_4 , we

$$\text{require} = \frac{1}{0.41} \text{ L} = 2.44 \text{ L of water}$$