#64878 Chemistry, General Chemistry

How many grams of dry NH_4Cl need to be added to 1.60 L of a 0.200 M solution of ammonia, NH_3, to prepare a buffer solution that has a pH of 8.85? K_b for ammonia is 1.8×10^{-5}.

Answer:

$NH_3 + H_2O \leftrightarrow NH_4^{(+)} + OH^{(-)}$

The Kb is small so the it is possible to say that all the $NH_4^{(+)}$ is released from NH_4Cl and the concentration of NH_3 will not change .

C of NH_3 = 0.200 M

pOH = 14 - 8.85

C of OH(-) = $10^{(- pOH)}$

$1.8 \cdot 10^{-5}$ = [C(OH) · C(NH_4)] / C(NH_3)

M (NH_4Cl) =

m (NH_4Cl) = [1.6 liters] · [C(NH_4)] · [molecular weigh of NH_4Cl] = 1.6 · 0.200 · 53.5 = 17.1 g