



5. In a titration experiment using a strong acid and a strong base,  $\text{HCl}_{(\text{aq})}$  and  $\text{NaOH}_{(\text{aq})}$ , 27.68 mL of  $\text{HCl}_{(\text{aq})}$  is used to neutralize 50.00 mL of 0.100 mol/L  $\text{NaOH}_{(\text{aq})}$ . Using the steps outlined below, determine the concentration of the  $\text{HCl}_{(\text{aq})}$ .

(a) Write the balanced chemical equation for this reaction.

(b) How many moles of  $\text{NaOH}_{(\text{aq})}$  are initially present?

(c) How many moles of  $\text{HCl}_{(\text{aq})}$  are required to completely react with the moles of  $\text{NaOH}_{(\text{aq})}$  calculated in (b)?

(d) Determine the concentration of  $\text{HCl}_{(\text{aq})}$ .