

## Answer on Question #45171 – Chemistry – Inorganic Chemistry

### Question

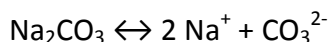
25.3 g of sodium carbonate  $\text{Na}_2\text{CO}_3$  is dissolved in enough water to make 250 ml of solution. If  $\text{Na}_2\text{CO}_3$  dissociates completely molar concentration of  $\text{Na}^+$  and  $\text{CO}_3^{2-}$  are

### Solution

Molar concentration of  $\text{Na}_2\text{CO}_3$  in the solution:

$$C_{\text{Na}_2\text{CO}_3} = \frac{m}{M \cdot V} = \frac{25.3 \text{ g}}{105.99 \frac{\text{g}}{\text{mol}} \cdot 0.250 \text{ L}} = 0.955 \text{ mol/L}$$

Chemical equation of sodium carbonate complete dissociation:



As is clear from the equation, dissociation of one mole of  $\text{Na}_2\text{CO}_3$  results in two moles of  $\text{Na}^+$  and one mole  $\text{CO}_3^{2-}$ , so

$$C_{\text{CO}_3^{2-}} = C_{\text{Na}_2\text{CO}_3} = 0.955 \text{ mol/L}$$

$$C_{\text{Na}^+} = 2 \cdot C_{\text{Na}_2\text{CO}_3} = 2 \cdot 0.955 = 1.910 \text{ mol/L}$$

**Answer:  $C_{\text{Na}^+} = 1.910 \text{ mol/L}$ ,  
 $C_{\text{CO}_3^{2-}} = 0.955 \text{ mol/L}$**