

P1 / P2 METHOD

Supplies

1. Sodium Hydroxide (0.2N)
2. Barium Chloride
3. Phenolphthalein
4. Sulfuric Acid (N/50)
5. Titration Dish
6. Stirring Rod
7. 3 x Pipette (1 or 2mL for filtrate and Sodium Hydroxide) (2 or 5mL for N/50)
8. Pipette safety bulb or pipette pump
9. Graduated cylinder (10ml for Barium Chloride)

TEST PROCEDURE

1. Determine the Pf end point as outlined in the Pf/Mf method. If the Pf is 0 there are no carbonates present.
2. Place 1 mL of filtrate in the titration dish and add 24 mL of distilled water.
3. Add 2 mL of 0.2N sodium hydroxide solution to convert bicarbonates to carbonates. Check the pH and if it is less than 11.5 continue to add 0.2N sodium hydroxide 1 mL at a time until the pH is over 11.5. Record the total amount of sodium hydroxide added in this step.
4. Add 3mL of barium chloride to precipitate all the possible carbonates. Add 4 drops of Phenolphthalein solution with stirring.
5. Titrate to the end point with N/50 Sulfuric Acid and record the number of mL of N/50 sulfuric acid added as the P1 end point.
6. Place exactly the same amounts of 0.2N Sodium Hydroxide, Barium Chloride, and Phenolphthalein into 25 mL of distilled water and titrate to the end point using N/50 sulfuric acid and record this as the P2 end point.

CALCULATIONS

$P_f = 0.0$, there are no carbonates present.

$P_1 > P_2$:

mg/l $\text{HCO}_3 = 0.0$

mg/l $\text{CO}_3 = 1200 [P_f - (P_1 - P_2)]$

mg/l $\text{OH} = 340 (P_1 - P_2)$

$P_2 > P_1$:

mg/l $\text{OH} = 0.0$

mg/l $\text{CO}_3 = 1200 \times P_f$

mg/l $\text{HCO}_3 = 1220(P_2 - P_1)$

