

Allendale Invitational – 2/25/23

Powder: Sodium Acetate Anhydrous

Extra reagent: Nitric acid (1 molar)

To score X points, the supporting observations...

- 5 points
  - Observations correctly “answer” question
  - Observations have sufficient detail
    - Ex: “Powder is shiny” < “Powder has “glitter-y shine”
  - Observations are quantitative where possible and provide appropriate units
    - How much powder?
    - How much reagent?
    - How much (change)?
- 4 points
  - Observations lack full quantitative details or appropriate units
- 3 points
  - Observations correctly “answer” question
  - Observations lack quantitative details
- OR
- Max points for an “Observation” that is actually an inference
  - Ex: “there was a reaction...”, “the dissolution was exothermic...” etc.
- 2 points
  - High-quality observation that doesn’t correctly “answer” the question but is related
    - Ex: For an exothermic reaction, “Was the reaction exothermic?” if the students provide good observations but found that temperature decreased.
- OR
- Max points for “write-in” response: students answered question correctly and with sufficient detail
- 1 point
  - Students provided “mid-tier” observations pertaining to the question, but that don’t correctly “answer” the question
- OR
- A write in response that correctly answers the question but not with sufficient detail
- 0 points
  - No response
- OR
- Supporting observation does not pertain to the question
- OR
- Write-in response is wrong or does not pertain to the question

1. 10-25 mL (may vary due to error or settling of powder clumps)
2. Rounded, irregular; forms clumps of many sizes
3. If an odor is noted, they should describe the odor ("smells like salt & vinegar chips"); some students might not be able to discern an odor
4. Yes; high-quality observations should include how much powder in how much water; high-quality observations should "speed" of dissolution (was stirring needed? How many seconds?)
5. Ionic; provided observations should mention that the powder dissolved and the resulting solution conducted electricity
6. Basic; pH = 8-9ish, varies by amount ; high-quality observation should include how much powder was added to how much water to make the solution
7. Transparent
8. Exothermic; high-quality observations should how much was dissolved in how much water include starting and ending temperatures
9. Yes (both); similar to Q4
10. ~3, varies by amount; high-quality observations should include how much powder and HCl was used
11. Increased by ~1, varies by amount from Q10
12. Increased; similar to Q8
13. No precipitate formed, the solution was transparent; how much powder in how much nitric acid
14. Increased by ~1; high quality observations should include before and after pH, along with how much powder was added to how much nitric
15. Bubbles may be observed for all of the reagents (these are likely due to trapped air in clumps, rather than a reaction)