**Boiling point elevations for solutions of benzoic acid in acetone**

**Objective** – To investigate the relationship between the molality and the boiling point of a solution.

1. In each of the 6 test tubes, measure 5.0 g acetone.
2. Leaving one of the test tubes, add 0.4, 0.8, 1.2, 1.6 and 2.0 g of benzioic acid.
3. Stir the solutions to ensure all the benzoic acid has dissolved.
4. What are the molalities of each solution:

0 g benzoic acid in 5 g acetone – Pure acetone so 🡪 0

0.5 g benzoic acid in 5 g acetone -

1.0 g benzoic acid in 5 g acetone -

1.5 g benzoic acid in 5 g acetone -

2.0 g benzoic acid in 5 g acetone –

2.5 g benzoic acid in 5 g acetone -

1. Hold each test tube in a water bath and record at which temperature the solution boils. How will you know it is boiling? ……………………………………………………………………………………………
2. Create a table of your results here:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Mass of benzoic acid in solution (g) | Molality  (mol/kg) | First run - Boiling point (oC) | Second run - Boiling point (oC) | Average boiling point  (oC) | Change in boiling point compared to pure acetone (oC) |
| 0 |  | 56.0 | 56.4 | 56.2 |  |
| 0.5 |  | 58.8 | 58.0 | 58.4 |  |
| 1.0 |  | 60.7 | 60.5 | 60.6 |  |
| 1.5 |  | 51.5 | 51.3 | 51.4 |  |
| 2.0 |  | 65.3 | 64.7 | 65.0 |  |
| 2.5 |  | 67.1 | 67.1 | 67.1 |  |

1. Plot a graph of molality (x-axis) against the boiling point (y-axis).
2. Create a blog to appropriately present this investigation and its findings. It should include a: title, objective, detailed hypothesis, complete table of results, graph, conclusion (explaining the results and how they match to your hypothesis), evaluation (discussing problems and suggesting improvements) and 2 references.

**Freezing point depressions for solutions of sugar in water**

**Objective** – To investigate the relationship between the molality and the freezing point of a solution.

1. In each of the 6 test tubes, measure 5.0 g water.
2. Leaving one of the test tubes, add 0.5, 1.0, 1.5, 2.0 and 2.5 g of sugar.
3. Stir the solutions to ensure all the salt has dissolved (you may need to warm the water slightly to dissolve all of the sugar).
4. What are the molalities of each sugar solution:

0 g sugar in 5.0 g water – Pure water so 🡪 0

0.5 g sugar in 5.0 g water –

1.0 g sugar in 5.0 g water –

1.5 g sugar in 5.0 g water –

2.0 g sugar in 5.0 g water –

2.5 g sugar in 5.0 g water –

1. Place the test tubes in a salt ice mixture and note at which temperature each solution freezes. How will you know it is freezing?

…………………………………………………………………………………………….

1. Create a table of your results here:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Mass of sugar in solution  (g) | Molality  (mol/kg) | Attempt 1 - Freezing point (oC) | Attempt 2 - Freezing point (oC) | Average freezing point (oC) | Change in freezing point compared to pure water (oC) |
| 0 |  | 0 | -0.6 | -0.3 |  |
| 0.5 |  | -0.6 | -0.8 | -0.7 |  |
| 1.0 |  | -0.3 | -0.1 | -0.2 |  |
| 1.5 |  | -1.7 | -1.7 | -1.7 |  |
| 2.0 |  | -2.0 | -2.2 | -2.1 |  |
| 2.5 |  | -2.9 | -2.5 | -2.7 |  |

1. Plot a graph of molality (x-axis) against the freezing point (y-axis).
2. Create a blog to appropriately present this investigation and its findings. It should include a: title, objective, detailed hypothesis, complete table of results, graph, conclusion (explaining the results and how they match to your hypothesis), evaluation (discussing problems and suggesting improvements) and 2 references.