**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Student Activity- Briggs-Rauscher Reaction**

**Learning Objective TRA-6.A** Explain the relationship between the occurrence of a reversible

chemical or physical process, and the establishment of equilibrium, to experimental observations

**Science Practice 5.E**Determine a balanced chemical equation for a given chemical

phenomenon.

**QUESTION:** How do we determine what reaction is occurring from observations?

**Materials:**

Solution #1 - 0.15M malonic acid and 0.020 M MnSO4.H2O

Solution #2 - 0.080 M H2SO4 and 0.20M KIO3

Solution #3 - 3.6 M H2O2

3% starch solution

10 mL graduated cylinder pipettes 100 mL beaker

**Procedure:**

1. Add four drops of the 3% starch solution to a 100 mL beaker.

2.Using a 10 mL graduate cylinder, add 10.00 mL of each of the three solutions given to you by your instructor into the 100 mL beaker.

3. Record your observations over the next 5 minutes.

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4. When the reaction has stopped, do NOT dump your mixtures down the sink. Place them in the waste disposal beaker in the hood.

Here are some important facts concerning the Briggs-Rauscher reaction:

* All compounds used to make the solutions were colorless.
* Starch-Iodine complexes have a deep blue color.
* Tri-iodide ions are amber colored in solution.
* iodine is a dark gray solid that is insoluble in water.

The following reactions have all occurred during this activity. Balance each of them. Then determine which observations correlate to which reactions.

**RXN #1:** 5 H2O2(aq) + \_\_\_IO3-(aq) + 2 H+(aq) \_\_\_­­O2(g) + \_\_\_­­I2(s) + \_\_\_­­H2O(l)

**RXN #2:** \_\_\_H2O2(aq) + \_\_\_I2(s) \_\_\_H+(aq) + \_\_\_­­I-(aq) + \_\_\_­­O2(g)

**RXN #3:** \_\_\_­­I2(s)  + \_\_\_­­I-(aq)  \_\_\_I3-(aq)

**RXN #4:** \_\_\_IO3-(aq) + \_\_\_H+(aq) + 5 Mn+2(aq)  \_\_\_­­I2(s) + \_\_\_­­H2O(l) + \_\_\_Mn+4(aq)

**RXN #5:** \_\_\_C3H4O4(aq) + 2 ­­I2(s)  + 2­­ H2O(l) + \_\_\_Mn+4(aq)  \_\_\_­­CO2(g) +\_\_\_­­I-(aq) +

\_\_\_H+(aq)  + 2 Mn+2(aq)

Conclusions based on the reactions above:

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