**Endothermic/Exothermic Lab**

**Introduction:**

When many ionic (these have a = or – charge due to losing or gaining electrons) compounds are dissolved in water-based materials, heat is either given off (exothermic) or absorbed (endothermic). In this lab, you will be examining this phenomenon with some common ionic compounds.

**How to do the lab:**

Basically, the lab procedure for this is fairly simple. Mix the chemicals in the data table as described, you should take temperature readings every 60 seconds. **When the temperature remains steady for two minutes**, you may stop your trial on that data set.

**The dependent variable for this lab is the temperature change of the solution. You will determine the independent variable for yourself – some ideas will be given during a class brainstorming session.**

**Things to keep in mind:**

* Wear your goggles at all times during the lab! If you must take them off, go out into the hall first.
* Make sure you wash your hands twice after doing this lab to ensure they’re clean.
* ***It is important to take temperature readings before you add the solid to the water as well as after – otherwise, you won’t know how much temperature change took place!***
* Make sure to swirl the solid in the jar until it has all dissolved!

Procedure

Part 1

**Measure out 10 g barium hydroxide carefully pore it into the erlynmeyer flask**

**Next measue 5 g ammonium thiocynate,**

**Add the barium to the vial as shownput it in a SMALL BEAKER**

**Turn on the temp probe**

**Take the air temp**

**Add the ammonium thiocynate as shown**

**Put stopper and probe in flask**

**Shake for 30 seconds**

**Record temp every 30 seconds**

**Describe below the change that take place.**

Data Table

Data Sheet For \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| Time  | Temperature |
|  |  |
| 30 seconds |  |
| 1 minute |  |
| 1 minute 30 seconds |  |
| 2 minute |  |
| 2 minute 30 seconds |  |
| 3 minute |  |
|  3 minute 30 seconds |  |
| 4 minute |  |
| 4 minute 30 seconds |  |
| 5 minute |  |
|  |  |

Part 2

Put 15 grams of calcium chloride chemical in a containerPlug the probe into the calculator

Mix 25 mL of water with the chemical, record the temperature at 0 minutes and each 30 seconds after that.

Data Table

Data Sheet For \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| Time  | Temperature |
|  |  |
| 30 seconds |  |
| 1 minute |  |
| 1 minute 30 seconds |  |
| 2 minute |  |
| 2 minute 30 seconds |  |
| 3 minute |  |
|  3 minute 30 seconds |  |
| 4 minute |  |
| 4 minute 30 seconds |  |
| 5 minute |  |
|  |  |

Part 3

Put 15 grams of ammonium nitrate chemical in a container Plug the probe into the calculator

Mix 25 mL of water with the chemical, record the temperature at 0 minutes and each 30 seconds after that

Data Table

Data Sheet For \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| Time  | Temperature |
|  |  |
| 30 seconds |  |
| 1 minute |  |
| 1 minute 30 seconds |  |
| 2 minute |  |
| 2 minute 30 seconds |  |
| 3 minute |  |
|  3 minute 30 seconds |  |
| 4 minute |  |
| 4 minute 30 seconds |  |
| 5 minute |  |
|  |  |

Part 4

 Do not add water to the heat pack. Open and place in the container.

Record the data in the table.

Every 30 seconds

Data Sheet For \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| Time  | Temperature |
|  |  |
| 30 seconds |  |
| 1 minute |  |
| 1 minute 30 seconds |  |
| 2 minute |  |
| 2 minute 30 seconds |  |
| 3 minute |  |
|  3 minute 30 seconds |  |
| 4 minute |  |
| 4 minute 30 seconds |  |
| 5 minute |  |
|  |  |

Graph- with a line graph, graph each temperature change, use a different color for each reaction. Set up like this.

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| time on x axis temp o

Discussion

1. Which reaction(s) are exothermic, EXPLAIN
2. Which reactions(s) are endothermic? EXPLAIN
3. Are these chemical, or physical changes>? Explain
4. What are the controls?
5. What are the manipulated variables?
6. What are dependent variables?

Conclusion- what can you tell me about exothermic and endothermic reactions. More is better. Examples, data etc.