

Reagents, Compositions, Weight Loss

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This project is an experimental project and there are no correct answers for most of it.

A. Experiments at 110°

For each reagent:

1. Determine its formula
2. Calculate the mole % of each element in the reagent
3. Calculate the weight % of each element in the reagent
4. Calculate the mole % of each oxide in the reagent
5. Calculate the weight % of each oxide in the reagent

Reagents vary, so read the label on the jars carefully, and then don't be surprised if there seem to be some inconsistencies. Silicic acid may have any of a number of compositions, and so too the aluminum hydroxide.

Ideal Element Weight %s, for the reagents we have in our lab:

	<u>Al</u>	<u>O</u>	<u>H</u>	<u>Si</u>	<u>Mg</u>	<u>Ca</u>	<u>C</u>
Al hydrox	34.59	61.53	3.88	0.00	0.00	0.00	0.00
silicic acid	0.00	61.46	2.58	35.96	0.00	0.00	0.00
MgO	0.00	39.70	0.00	0.00	60.30	0.00	0.00
CaCO ₃	0.00	47.96	0.00	0.00	0.00	40.04	12.00

Ideal Oxide Weight %s for the reagents we have in our lab:

	<u>Al₂O₃</u>	<u>H₂O</u>	<u>SiO₂</u>	<u>MgO</u>	<u>CaO</u>	<u>CO₂</u>
Al hydrox	65.36	34.64	0.00	0.00	0.00	0.00
silicic acid	0.00	23.07	76.93	0.00	0.00	0.00
MgO	0.00	0.00	0.00	100.00	0.00	0.00
CaCO ₃	0.00	0.00	0.00	0.00	56.03	43.97

The Results:

After heating to 110°, the reagents should all show some weight loss. Results depend on the reagents used and so will vary from lab to lab. Mostly, there should be only a minor amount of weight loss as absorbed water is driven off. In my experience, MgO and CaCO₃ tend to lose the most weight. Depending on they were stored and the relative humidity, the loss can be 3-10%.

B. Experiments at 1200°

The results:

As before, results may vary depending on many things. Ideally, Al hydroxides loses water to become Al₂O₃. Silicic acid loses water to become SiO₂, MgO doesn't change much, and CaCO₃ loses CO₂ to become CaO.

So, ideal weight losses will be:

	<u>ideal</u> <u>weight loss</u>
Al hydrox	34.64
silicic acid	23.07
MgO	0
CaCO ₃	43.97

If the reagents are not weighed quite quickly after being removed from the oven, they will regain some weight. Especially the CaO; it can absorb lots of water very quickly.