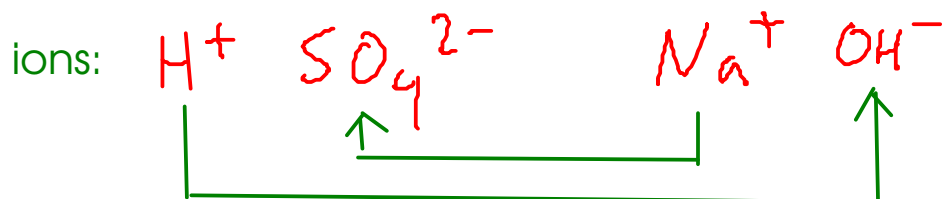
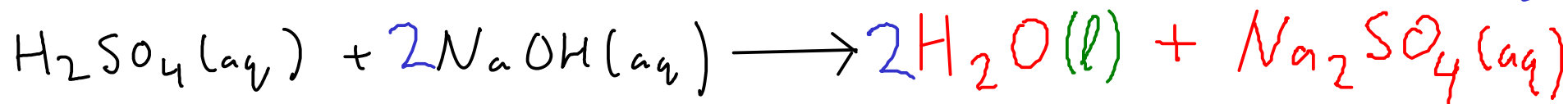
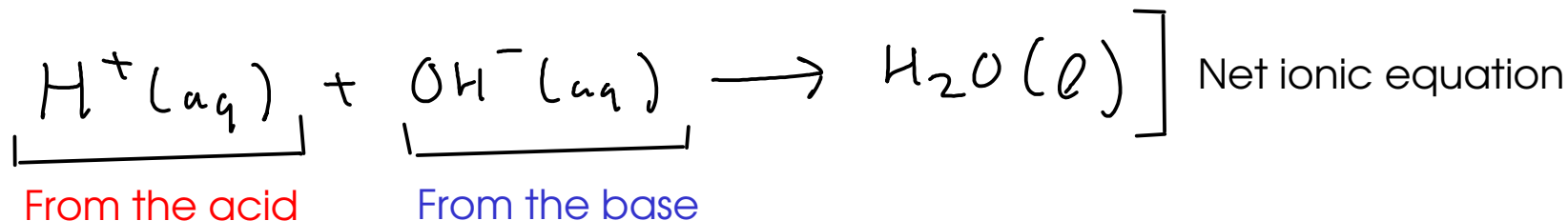


ACID/BASE or NEUTRALIZATION reactions continued

- the driving force of these reactions is the formation of water molecules.



- How can this reaction be detected?

- pH detector (indicator paper, etc.)

- do the products have similar chemical properties to the reactants?

- release of heat!

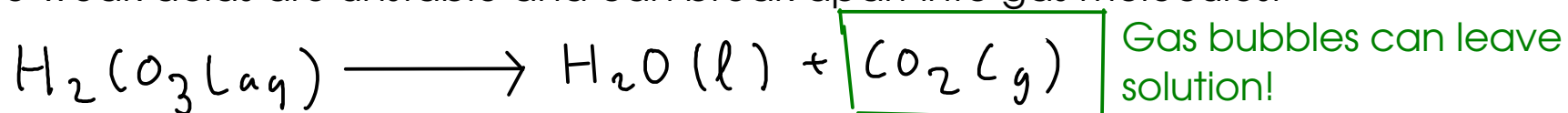
... formation of water is usually accompanied by a release of heat

GAS FORMATION / OTHER MOLECULES

- There are a few other molecules that can be made with exchange-type chemistry.
- Most of these molecules are unstable and can break apart to form gases.

- Formation of a weak acid:

- The formation of ANY weak acid in an exchange-type reaction can be a driving force.
- Some weak acids are unstable and can break apart into gas molecules.

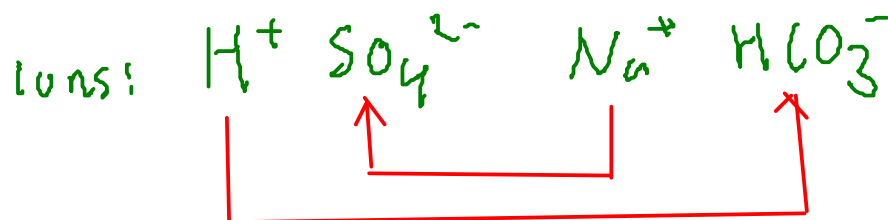


... but how would you form carbonic acid in an exchange-type reaction?

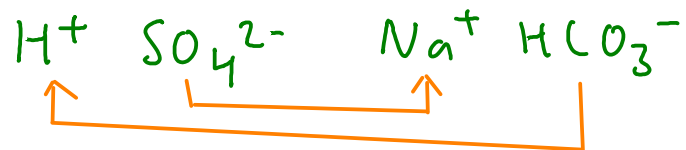
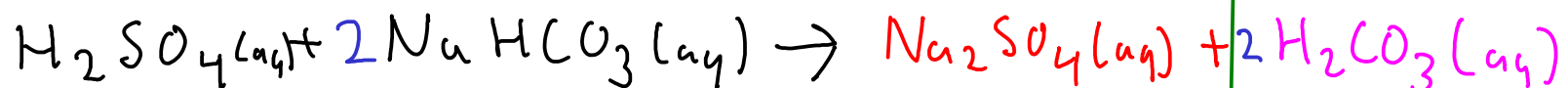
acid + carbonate CO_3^{2-}

OR

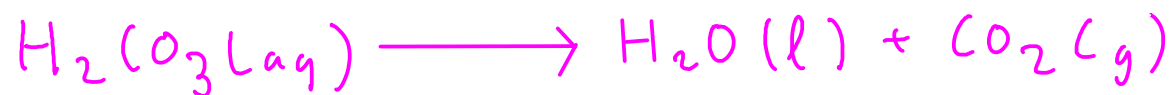
acid + bicarbonate HCO_3^-



Formation of carbonic acid drives the reaction ... BUT ...

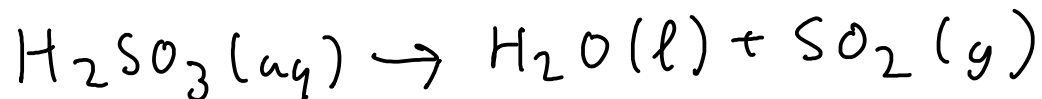


... but when we mix sulfuric acid and sodium bicarbonate, we observe BUBBLES. We need to write an equation that agrees with our observations. We know that carbonic acid decomposes, so we go ahead and put that into our equation.

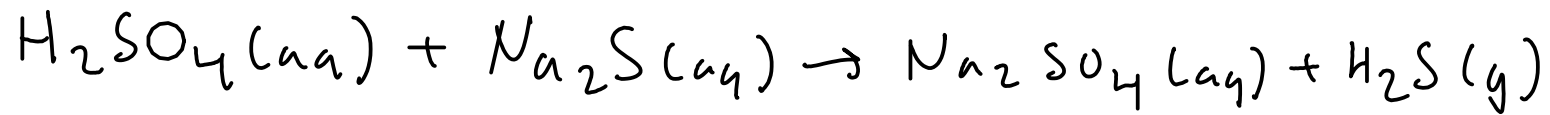


Other molecules of interest:

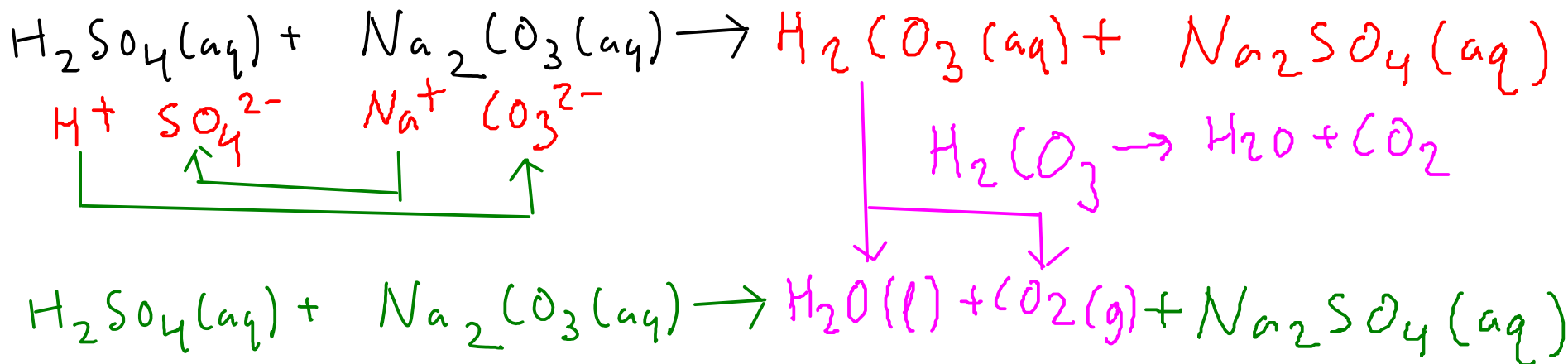
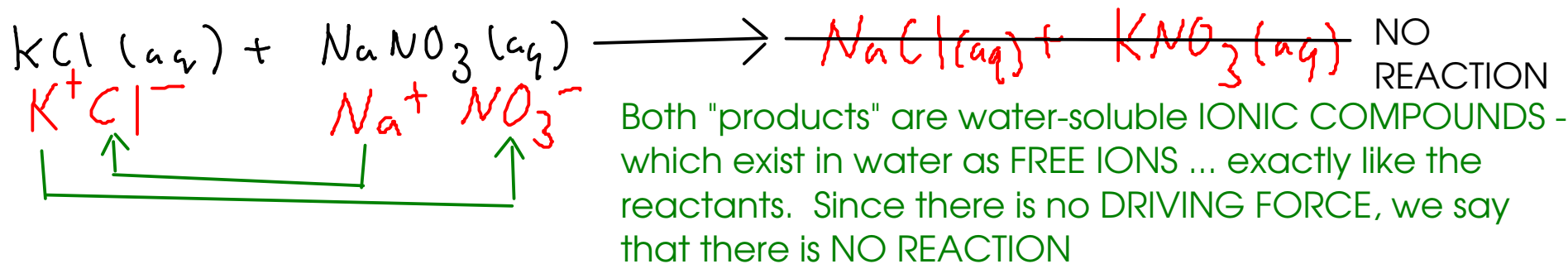
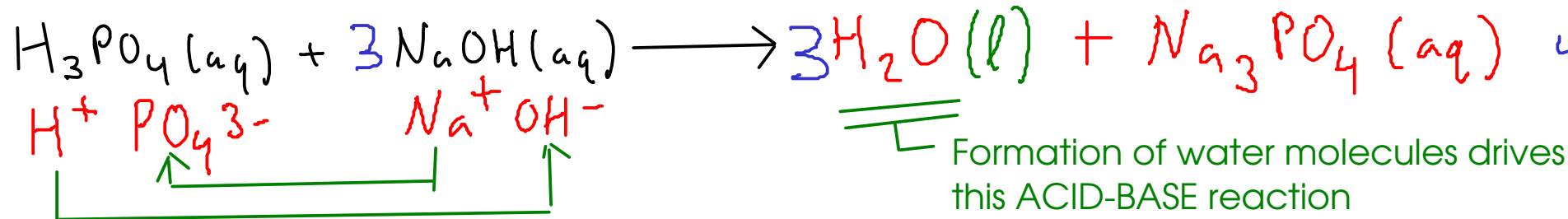
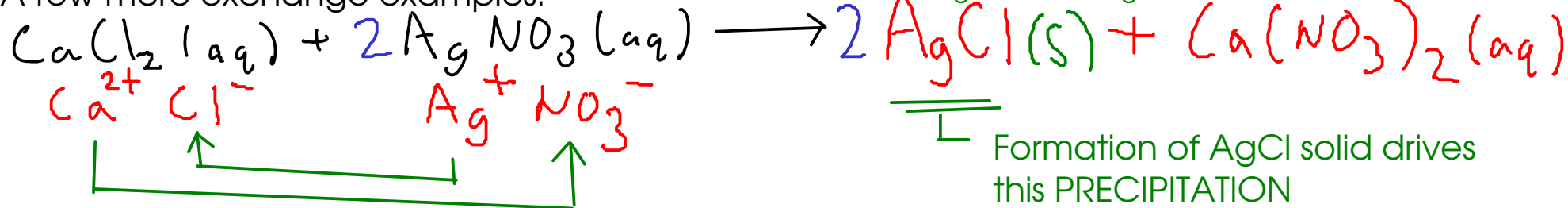
H_2SO_3 : sulfurous acid - React an ACID with a SULFITE



H_2S : hydrogen sulfide (gas) - React an ACID with a SULFIDE



A few more exchange examples:



Formation of carbonic acid (and its decomposition into water and carbon dioxide gas) drives this reaction!

* Transition metals DO NOT change their charge in exchange reactions!