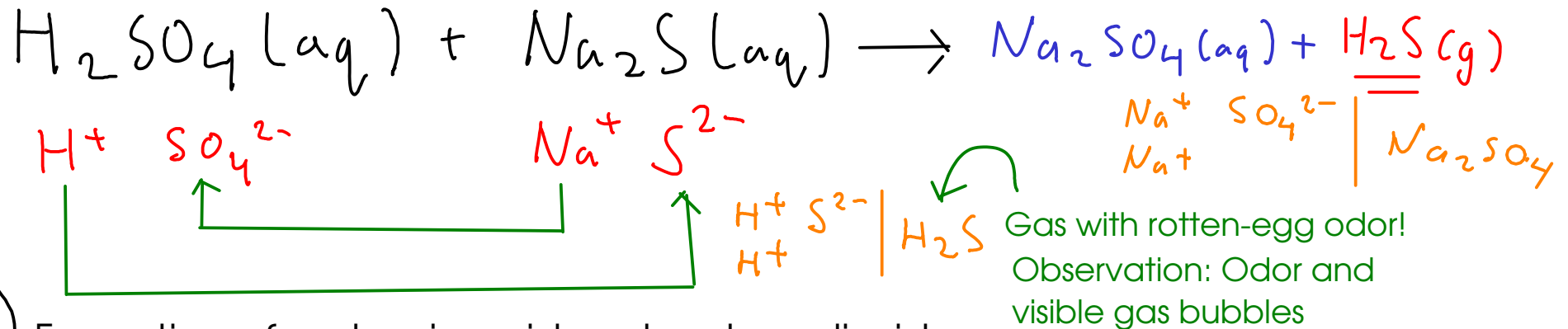


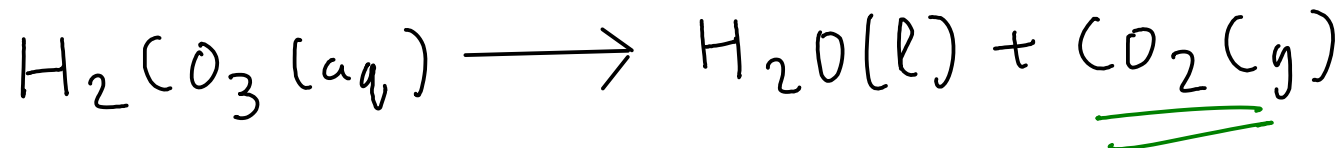
DOUBLE REPLACEMENTS THAT FORM GASES

① Formation of hydrogen sulfide: H_2S

- need an ACID (source of hydrogen ion) and a SULFIDE



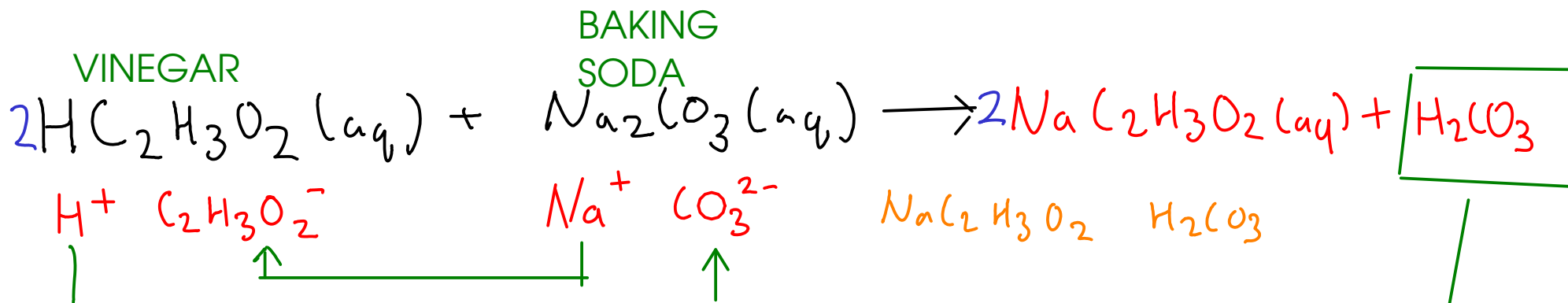
② Formation of carbonic acid and carbon dioxide:



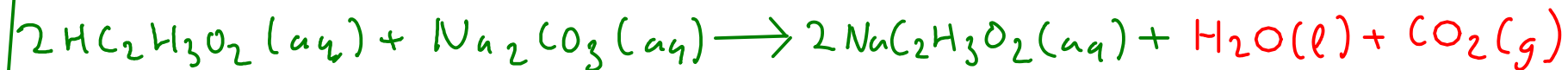
- to form carbonic acid by double replacement, you need a source of hydrogen ion (ACID) and a source of carbonate (can be CARBONATE or BICARBONATE)



Example of a reactions that forms carbonic acid, then gas: The "baking soda volcano"!

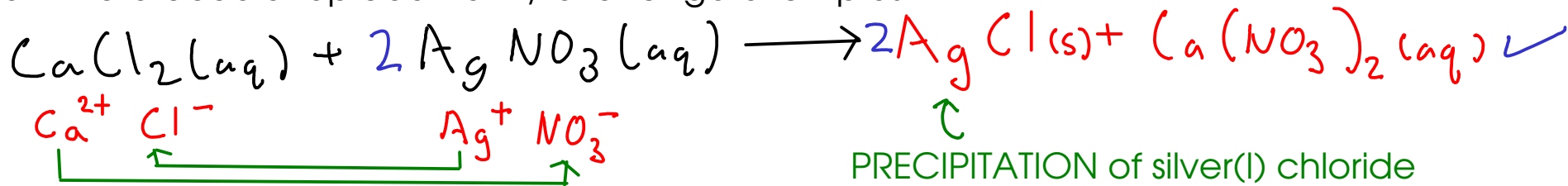


... but carbonic acid decomposes, and we get GAS BUBBLES



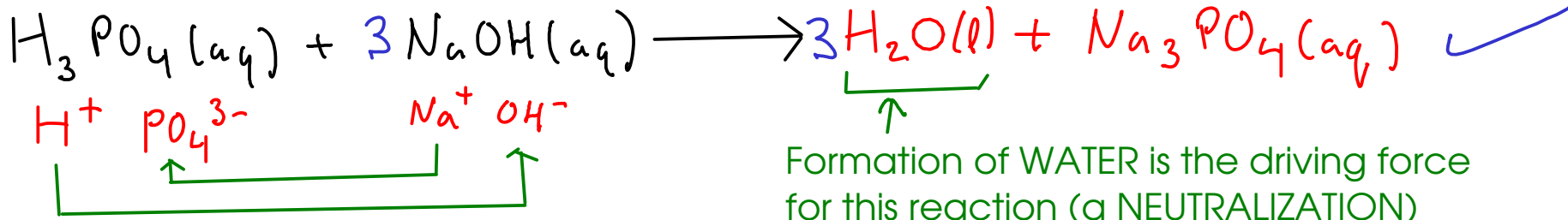
This is the overall process. We show carbon dioxide and water as products, since we want to show the reaction as it's actually observed -with carbonic acid broken down to water and (gaseous) carbon dioxide.

A few more double replacement / exchange examples:

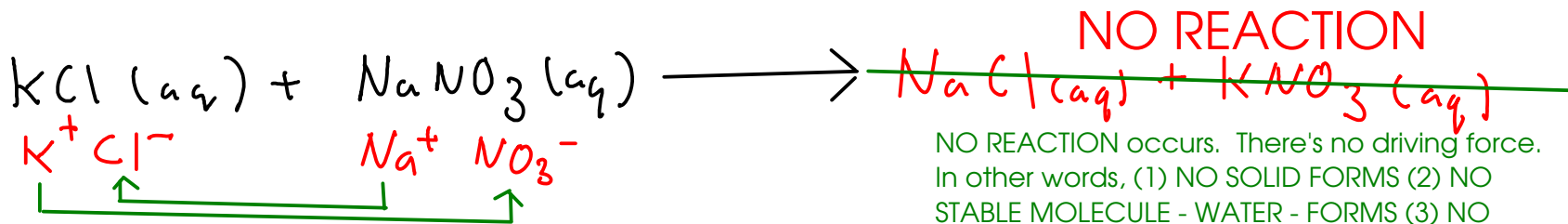


In exchange reactions, transition metal ions DO NOT change charge!

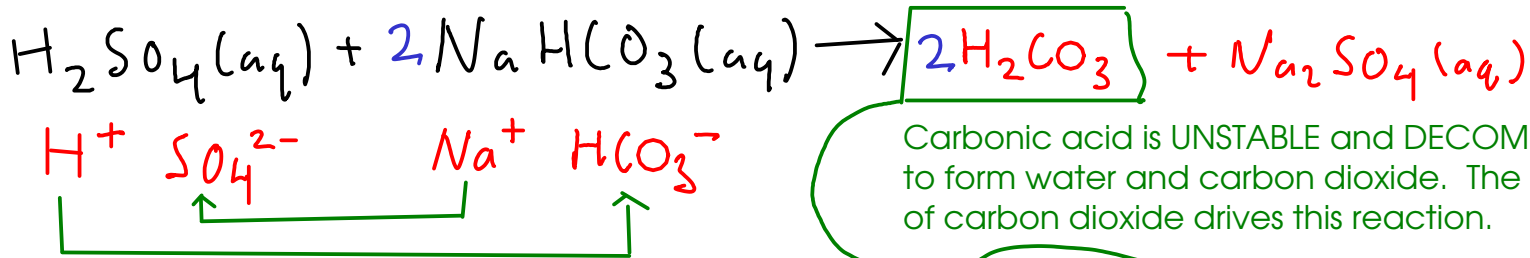
PRECIPITATION of silver(I) chloride drives this reaction!



Formation of WATER is the driving force for this reaction (a NEUTRALIZATION)

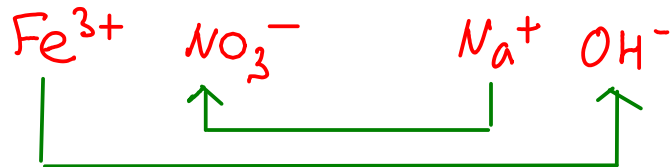


NO REACTION occurs. There's no driving force. In other words, (1) NO SOLID FORMS (2) NO STABLE MOLECULE - WATER - FORMS (3) NO UNSTABLE MOLECULE - CARBONIC ACID - FORMS. So we're left with "ion soup"!

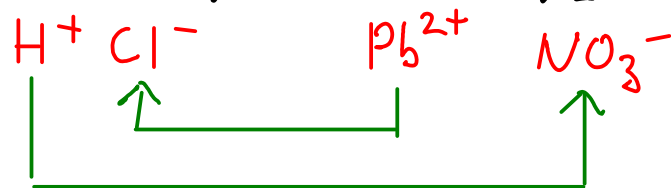


Carbonic acid is UNSTABLE and DECOMPOSES to form water and carbon dioxide. The release of carbon dioxide drives this reaction.





Formation of insoluble (the book uses the term "slightly soluble") iron(III) hydroxide drives this reaction. This is a PRECIPITATION!



Formation of insoluble lead(II) chloride drives this reaction. This is another PRECIPITATION!