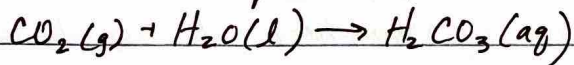
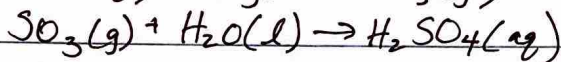
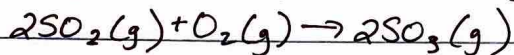
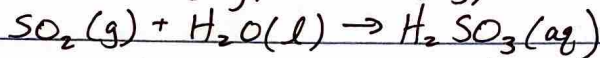
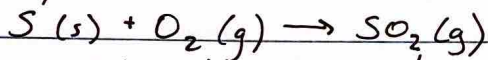


Acid Rain Wksht Answer Key

1. Natural rain has a pH of ~ 5.6 due to carbon dioxide combining with water vapor in the atmosphere to form carbonic acid.



2. Burning coal produces sulfurous or sulfuric acid:

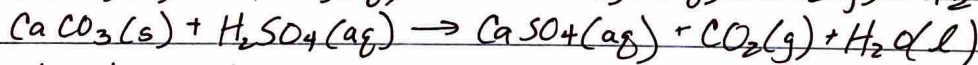
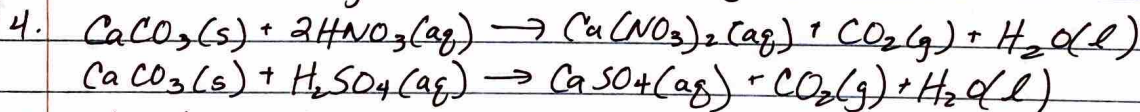


3. Internal combustion engines produce nitrous/nitric acid through ~~the~~ combustion ^{to produce} of NO_x compounds, ^{which then combines} with water vapor.

2 different ways to reduce NO_x emissions:

- catalytic converters in vehicles to convert NO to N_2 and CO_2

- low-temp combustion to reduce NO production by recirculating exhaust gases back into the engine.



5. - Leaching of metal ions in soil

- Leaching of Al^{3+} ions into water, impacting aquatic life

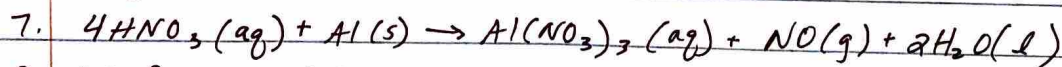
- Eutrophication (over-fertilizing bodies of water) due to nitrates in acid rain, which cause an increase in algal blooms

- Sulfate/nitrate particulates can be inhaled by humans and irritate respiratory tract

- Increase in water acidity due to runoff in bodies of water

- Erosion of marble and limestone

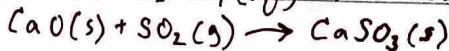
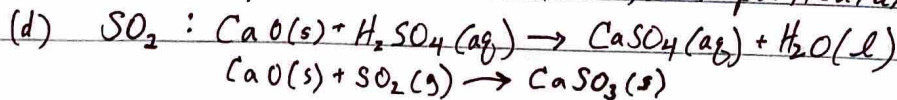
6. Crushing coal and washing with water before combustion can reduce SO_2 emissions



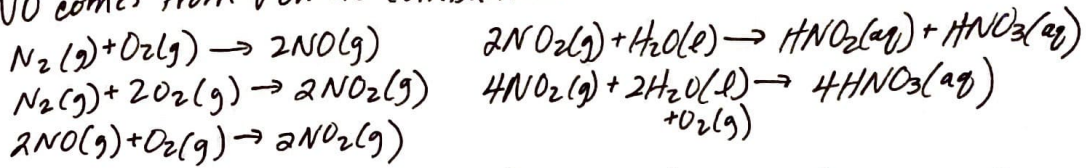
8. (a) SO_2 and NO

(b) SO_2

(c) ~~particulates can act as catalysts to produce~~ SO_2 can form other SO_x compounds. These react to form particulates.



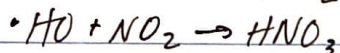
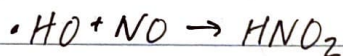
8. (c) NO comes from vehicle combustion.



9. (a) Dry acid deposition (dust/smoke) occurs closer to the source of pollution compared to wet acid deposition (rain, snow, sleet, etc.)

9.8 (b) SO_2 and NO_x produced from burning of fossil fuels / combustion and released into the atmosphere. Oxidation and hydrolysis produce various acids in the atmosphere (H_2SO_3 , H_2SO_4 , HNO_2 , HNO_3).
Acids in clouds fall as precipitation.

10. • HO forms acid rain:



• HO forms SO_3 , which reacts w/water to form sulfuric acid:

