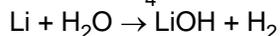
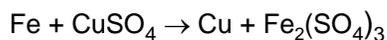


The Activity Series



Text Reference: 3.3 (pg. 125 - 128)

We have looked at several reactions:



Such experiments reveal trends. The activity series ranks the relative reactivity of metals. It allows us to predict if certain chemicals will undergo single displacement reactions when mixed: metals near the top are most reactive and will displace metals near the bottom.

Q: Which of these will react?

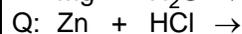


K
Na
Li
Ca
Mg
Al
Zn
Fe
Ni
Sn
Pb
H
Cu
Hg
Ag
Au

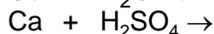
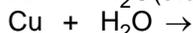
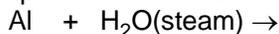
H is the only nonmetal listed. H_2 may be displaced from acids or can be given off when a metal reacts with H_2O (producing H_2 + metal hydroxide). The reaction with H_2O depends on metal reactivity & water temp.

Q: will Mg react with H_2O ?

A:



Complete these reactions:



cold H_2O
hot H_2O
steam
acid

K
Na
Li
Ca
Mg
Al
Zn
Fe
Ni
Sn
Pb
H
Cu
Hg
Ag
Au

Other Activity Series Information

- All metals will have a specific place in the activity series. For simplicity, only the most common metals are shown.
- The metals near the top of the activity series are more reactive because their valence electrons are more easily removed.
- On tests and exams the activity series may appear as K, Na, ... Ag, Au; you must remember that K is reactive, Au is not.
- If the valence of a metal is not indicated in the question, use its most common valence (in bold on your periodic table) to determine the correct chemical formula.

Activity series lab

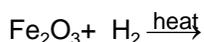
- On the next slide, place a check in the corner of boxes where you think reactions will take place.
- Get a plastic spot plate and a glass rod.
- Combine chemicals specified in the chart. Figure out a way to keep track of the chemicals. Use a $\frac{1}{4}$ scoop for solids (the less, the better). Use 1 squeeze of an eyedropper for solutions.
- Write chemical equations for chemicals that reacted. Write NR where there was no reaction.
- Dump used chemicals into the large funnel at the front of the room (use a squirt bottle to rinse remaining chemicals into the funnel). Wash the spot plate and glass rod very well. Dry & return.

	Mg	Cu	Zn
AgNO_3	$\text{Mg} + \text{AgNO}_3 \rightarrow \text{Ag} + \text{Mg}(\text{NO}_3)_2$ <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H_2SO_4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
$\text{Fe}(\text{NO}_3)_3$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CuCl_2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Oxides

The formation and behavior of oxides can also be predicted via the activity series.

Complete these reactions:



Oxides form via the addition of oxygen:
$$\text{K} + \text{O}_2 \rightarrow \text{K}_2\text{O}$$

Oxides plus H_2 (with heat) will change to metal and H_2O :
$$\text{NiO} + \text{H}_2 \xrightarrow{\text{heat}} \text{Ni} + \text{H}_2\text{O}$$

Oxides decompose with heat:
$$\text{HgO} \xrightarrow{\text{heat}} \text{Hg} + \text{O}_2$$

K
Na
Li
Ca
Mg
Al
Zn
Fe
Ni
Sn
Pb
H
Cu
Hg
Ag
Au