

IDEA EXCHANGE

COVER SHEET

Name: Colleen Balzer
School: Brooks Secondary School
Powell River
email: cbalzer@sd47.bc.ca

ACTIVITY DETAILS

Activity Name: Mini Lab on Spontaneity
Targeted Grade Level: Grade 12
Subject: Chemistry 12 or if modified, Science 10
(chemistry)
Reactivity Series OR Intro to Redox
Reactions

NOTES:

This is a quick easy to prep lab that helps students understand the concepts of the reactivity series. It also is a good introduction to half reactions and balancing redox reactions.

This is an adaptation of a portion of HEATH LABS 21 A.

MINI LAB ON SPONTANEITY OF REACTIONS

Usually it is assumed that all chemical reactions are spontaneous (i.e. they occur without addition of energy continuously). Spontaneous redox reactions provide visible evidence of a reaction quickly. For example:

PRE LAB:

- What does Redox Stand For?
- Define Reduction:
- Define Oxidation:
- What is a reducing agent?
- What is an oxidizing agent?

PURPOSE: To test the assumption that all single replacement reaction are spontaneous.

Which combinations of copper, lead, zinc, magnesium metals and their aqueous ion solutions provide spontaneous reactions?

PROCEDURE:

Place three drops of each solution in separate locations on a clean area of four metal strips.

MATERIALS: Reusable strips of copper, lead, Magnesium and zinc
 0.10M solutions of Copper(II) nitrate
 Lead (II) nitrate
 Silver (I) nitrate
 Magnesium Nitrate
 Zinc nitrate

Use STEEL wool for clean up on the metal strips.

DATA:

Fill in the Data chart Below with observations of the reactions:

METAL IONS	Cu^{2+}	Pb^{2+}	Zn^{2+}	Mg^{2+}	Ag^{1+}
METALS					
Copper					
Lead					
Zinc					
Magnesium					

FROM THE DATA ABOVE DETERMINE WHICH ARE THE MOST ACTIVE:
 IONS: METALS:

(By looking at the number of reactions)

2. Write the balanced reactions for the observed reactions.

METAL IONS	Cu ²⁺	Pb ²⁺	Zn ²⁺	Mg ²⁺	Ag ¹⁺
Copper					
Lead					
Zinc					
Magnesium					

QUESTIONS/CALCULATIONS

- Write balanced $\frac{1}{2}$ reactions for each oxidation reaction (place in decreasing order of activity)
- Write the balanced $\frac{1}{2}$ reactions for each reduction reaction (place in decreasing order of activity)
- Compare your answers in #2 with a REDUCTION POTENTIAL chart. How do your results compare (explain).
- For all reactions that occurred complete and balance the redox reactions.

ERROR SUMMARY:

CONCLUSION:

DUE: _____