

Name: _____
Blk: _____ Date: _____

Chemistry 12

Electrochemistry Lesson #3
Predicting the spontaneity of a REDOX reaction!!!

Turn to pg 336 in Hebbden " Standard Reduction Potentials of Half- Cells"
This table is constructed similarly to the Relative Strengths of Acids table
HOW?

IMPORTANT TO NOTE, IN GENERAL:

a. METALS are found _____
exceptions include: _____

b. HALOGENS + OXYANIONS (_____) are found _____

c. METALS such as _____ have more than one
common oxidation number, therefore, _____

example:

d. _____ is found at the TOP LEFT and LOWER RIGHT of the table

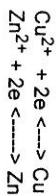
HOW TO READ THE HALF- Reactions in the table:

Species in upper left "GO FORWARD", while species in bottom right "GO
BACKWARD". Although each reaction can go either forward or backward.

USE Equilibrium arrows when referring to an isolated half-reaction
USE the specific direction for the half-reaction involved in a redox reaction
IMPT!!! YOU MUST GET USED TO THE FOLLOWING IDEA:



NOW, consider the following situation:



The compound that is HIGHER ON THE LEFT SIDE has greater tendency to be
_____. Therefore _____ undergoes reduction:

The compound that is LOWER ON THE RIGHT SIDE has greater tendency to
be _____. Therefore _____ undergoes oxidation:

*****re-writing the oxidation reaction places the _____ on the reactant side*****

The overall reaction that SPONTANEOUSLY OCCURS is found by _____

For example:

WHEN THE TWO HALF-CELLS ARE JOINED, THE HIGHER HALF-REACTION
ON THE TABLE WILL UNDERGO _____ AND THE LOWER
ONE WILL UNDERGO _____.

PROBLEM: what if you are given two POTENTIAL reactants and asked to
determine whether or not a reaction will occur?

1. LOCATE each reactant on the TABLE!

a. if the BOTH appear on the same side.... NO REACTION OCCURS

for example:

b. if one is on the left and the other is on the right, there are two possibilities:
i. if the species to be reduced (on the left hand side) is HIGHER than the
species to be oxidized (on the right hand side)...A SPONTANEOUS RXN
OCCURS!

for example:

ii. If the species to be reduced (on the left hand side) is LOWER than the species to be oxidized (on the right hand side) ... NO RXN OCCURSI

for example:

Chemistry 12
Spontaneous REDOX reactions Worksheet

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Example 1:

Predict whether or not a reaction will occur when the following are mixed:

a. Cl_2 with Br^-

b. Sn with Mn

c. Ni^{2+} with Pb

For **HOMEWORK** do Exercises pg 199 - 200 7-18 odd letters only (ie: a, c, e)
PLOS S4 - S6

1. You are given three half reactions:



It is determined experimentally that:

M^{2+} reacts with L(s) but no reaction occurs between M^{2+} and K(s).

Arrange the half-reactions in decreasing strength as oxidizing agents (greatest strength first)

2. You are given four half reactions:



It is determined experimentally that:

E^{2+} reacts with C(s), D (s) and F(s). No reaction occurs between C^{2+} and any solid and F^{2+} reacts only with C(s). Arrange the half reactions in decreasing strength as oxidizing agents (greatest strength first)

3. You are given five half reactions:



It is determined experimentally that:

T^{2+} reacts with R(s), Q(s), U^{2+} does not react with S(s) and R^{2+} reacts with Q(s). Arrange the half reactions in decreasing strength as oxidizing agents (greatest strength first)