Standard Reduction Potentials – Reading Guide

*section 17.3 in OpenStax*

The cell potential is called the **standard cell potential** (E°cell) or **standard emf** under standard conditions:

* Concentration for reactants in solution = \_\_\_\_\_\_\_\_\_
* Pressure for gaseous reactions = \_\_\_\_\_\_\_\_\_\_

The **standard hydrogen electrode** (SHE) is chosen to have a potential of \_\_\_\_\_\_\_\_\_.

Everything else is measured relative to the SHE.

**Calculating Standard Cell Potential**

The formula for calculating standard cell potential is:

E = E - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Note: For this equation, E° values are for the reduction half reactions, and the minus sign above is because oxidation is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of reduction.

Table 17.2 shows **standard reduction potentials,** E°. Notice that all of these are REDUCTION reactions.

Work through Example 17.4. In a **galvanic** cell, the reaction at the \_\_\_\_\_\_\_\_\_\_\_\_\_ has the more negative E°, and thus is more likely to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(*oxidized/reduced*).

Substances listed near the **bottom** of table 17.2 have very large\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *(positive/negative)* standard reduction potentials (E°red). These substances want to undergo \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *(oxidation/reduction).* They are very good \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*(oxidizing/reducing)* agents.

Substances listed near the **top** of table 17.2 have very large\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *(positive/negative)* standard reduction potentials (E°red). These substances want to undergo \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *(oxidation/reduction).* They are very good \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*(oxidizing/reducing)* agents.

What is the standard cell potential for a **galvanic** cell that consists of acid (H+) and iron?

2 H+ (*aq*) + 2 e– 🡪 H2 (*g*) E° = 0 V

Fe2+ (*aq*) + 2 e– 🡪 Fe (*s*) E° = –0.447 V

(*ans.* E= 0.447 V)

Based on your answer above, is Fe (s) dissolving in acid a spontaneous process? Explain.

In general, metals whose half-reactions are listed \_\_\_\_\_\_\_\_\_\_\_\_\_ *(below/above)* the reduction of H+ to H2 will dissolve in acid.

**End of Chapter 17 Practice Problems**

#23a–b, 25

For detailed solutions to these problems, go to the [OpenStax website](https://openstaxcollege.org/textbooks/chemistry/resources) and download the “Student Answer and Solution Guide.”