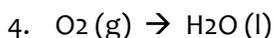
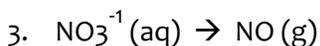
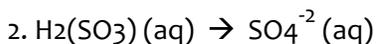
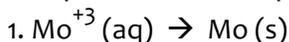




## CHE1031: Redox review set

### Half-equations

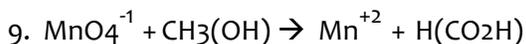
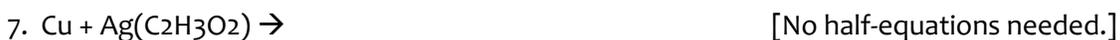
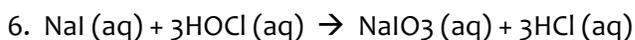
Complete each half equation and identify it as oxidation or reduction.



### Redox or not?

For each set of reactants or each chemical equation:

- If there are not products, predict their formulas.
- Balance the chemical equation.
- Assign oxidation numbers to each atom.
- Determine whether redox happens. [If not, what type of reaction is this?]
- Determine what is oxidized and what is reduced.
- Identify the oxidizing agent and the reducing agent.
- Create half equations and solve them.

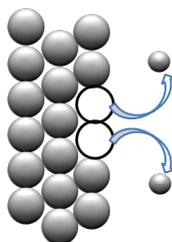




**Voltaic cells**

12. The diagram below represents a molecular scale view of the process that happens at one electrode of a voltaic cell.

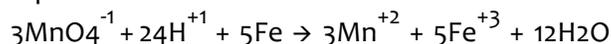
- (a) Is that process oxidation or reduction?
- (b) Is the electrode the anode or cathode?
- (c) Why are the atoms represented by larger electrons than the ions?



13. A voltaic cell is created by linking two half-cells with a salt bridge and a wire connecting anode and cathode. Electrons move from the iron electrode to the silver electrode. The iron electrode sits in a beaker of 1 M iron (II) ions and the silver electrode sits in a beaker of 1 M silver (I) ions.
- (a) What metal is the cathode?
  - (b) How would you calculate  $E_{\text{cell}}$ ? Do so!
14. Write the half-equation that occurs at a hydrogen electrode in acidic aqueous solution when it serves as the anode of a voltaic cell.
15. Why is it impossible to measure the standard reduction potential of a single half-cell? How is the standard reduction potential of a cell determined?
16. A voltaic cell consists of a strip of cadmium metal in a solution of  $\text{Cd}(\text{NO}_3)_2$  in one beaker and a platinum electrode in the other beaker immersed in a  $\text{NaCl}$  solution with  $\text{Cl}_2$  gas bubbled around the electrode. A salt bridge connects the two beakers.
- (a) Which electrode is the anode and which is the cathode?
  - (b) Does the Cd electrode gain or lose mass?
  - (c) Write the equation for the complete voltaic cell.
  - (d) What is the electromotive force generated by the cell under standard conditions.

**Batteries & electromotive force**

17. Write an equation for the half reaction that occurs at the anode of the balanced chemical equation shown below:



18. Calculate the  $E^\circ_{\text{Cell}}$  value of the voltaic cell that uses the reaction shown here:

