

Honors Chemistry: Chemical Reactions Podcasts 7-9 Problem Set- Redox Reactions

1). What is the oxidation number for each element in KMnO_4 ?

2). What is the oxidation number for Cr in $\text{Cr}_2\text{O}_7^{2-}$?

3). What is the oxidation number for C in CO_2 ?

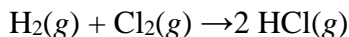
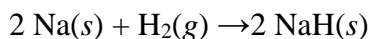
4). What is the oxidation number for C in CH_4 ?

5). Arrange the following oxidizing and reducing agents in order of increasing strength:

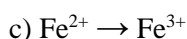
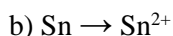
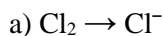
Reducing agents: Cl^- , Cu, H_2 , H^- , HF, Pb, and Zn

Oxidizing agents: Cr^{3+} , $\text{Cr}_2\text{O}_7^{2-}$, Cu^{2+} , H^+ , O_2 , O_3 , and Na^+

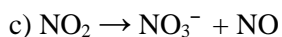
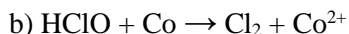
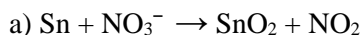
6). Identify hydrogen gas as either an oxidizing agent or a reducing agent in each reaction below. Justify your response.



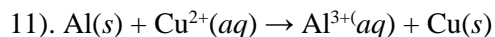
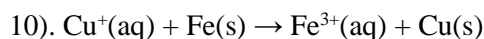
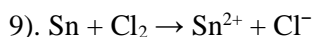
7). Balance each half-reaction for atoms and charge:



8). Separate each of these redox reactions into their two half-reactions (but do not balance):



For the following questions separate each into half-reactions, balance, and recombine.



Use the net ionic method to balance the following redox reaction:

12). Solid magnesium is mixed with aqueous aluminum phosphate.

Rules for Oxidation Numbers	Examples
Atoms in elemental form = 0	Na, O ₂ , As, N ₂ , Mg
Monatomic ions = the ion's charge	K ⁺ , Ca ²⁺ , Fe ³⁺ , S ²⁻ , Al ³⁺
Oxygen = -2 except in peroxides = -1	CaO (O = -2); Na ₂ O ₂ (O = -1)
Hydrogen = +1 except metal hydrides = -1	HCl (H = +1); LiH (H = -1)
Oxidation states in compounds must sum to zero.	FeCl ₂ , FeCl ₃ contain Fe ²⁺ and Fe ³⁺
Oxidation states in polyatomic ions must sum to the ion charge.	ClO ₄ ⁻ , ClO ₃ ⁻ chlorine = +7 and +5
Assign the more electronegative element a negative oxidation number.	PF ₅ contains F = -1 and P = +5