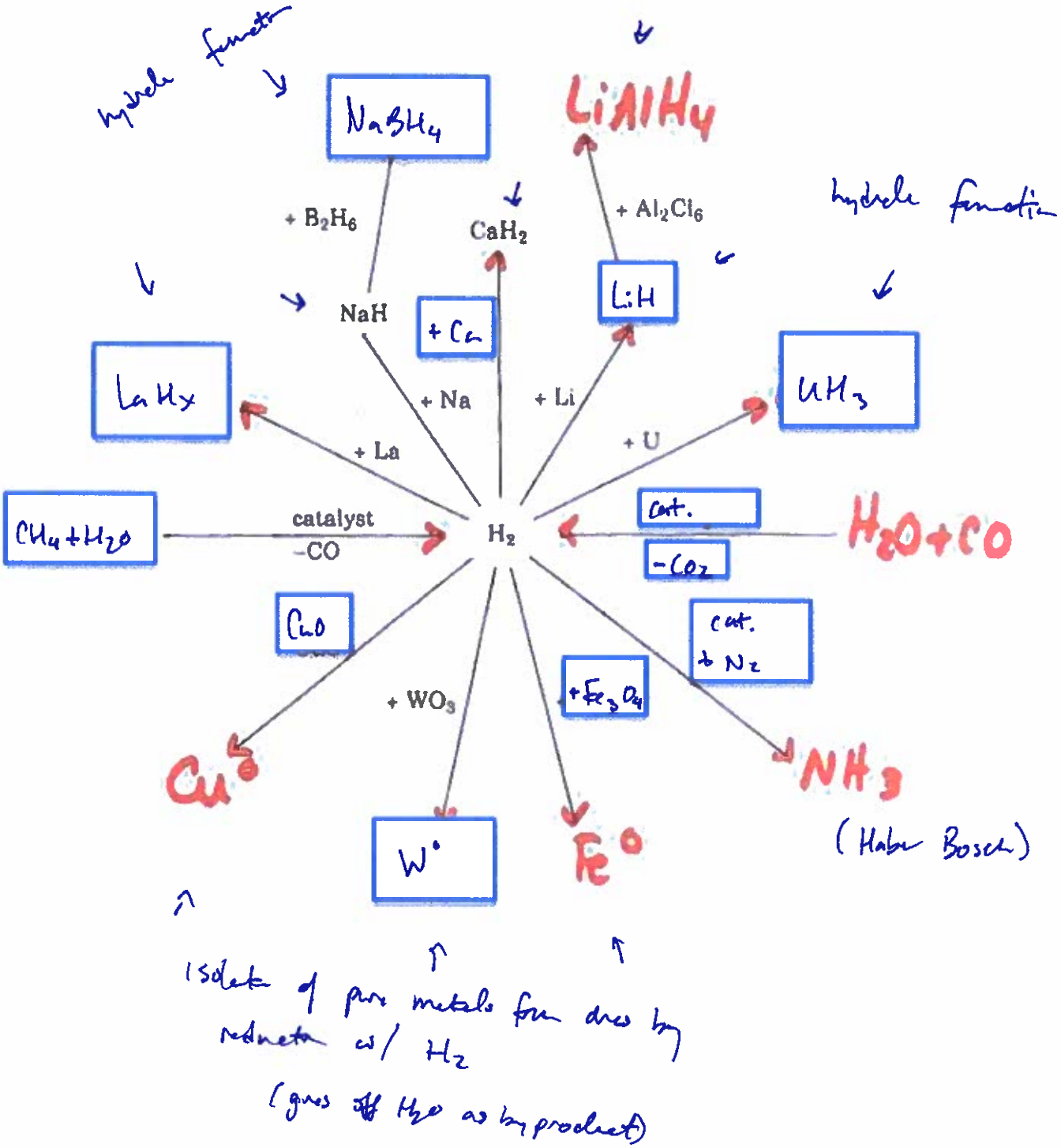
**CHEM 362 – Fall 2019**
*Prof K .R. Dunbar*
*TA: Ellen Song*

**PLTL Worksheet #12:**

* PLTL Survey

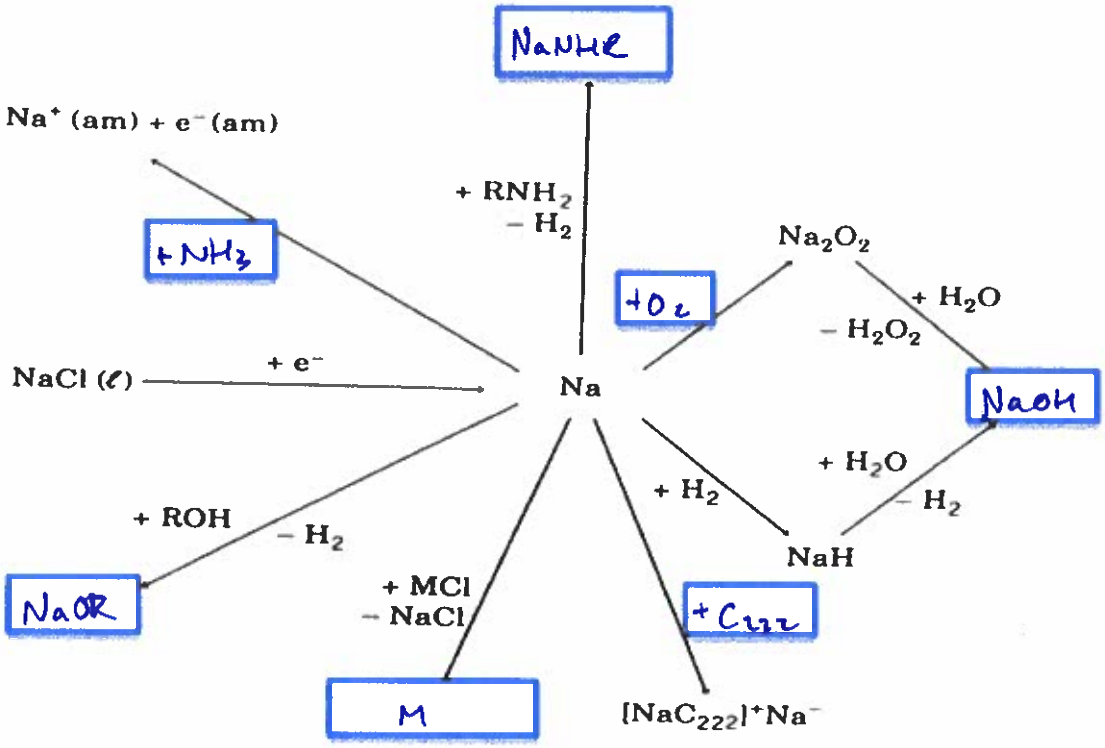
1. Fill in the blanks of the figures below

a.

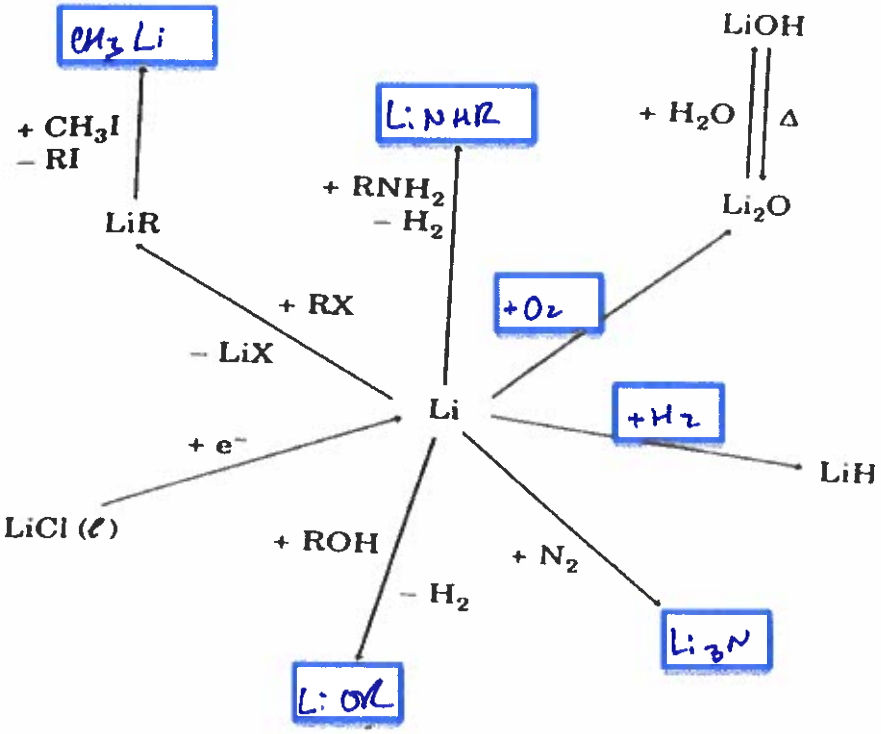


**CHEM 362 – Fall 2019**
*Prof K .R. Dunbar*
*TA: Ellen Song*

b.




c.



**CHEM 362 – Fall 2019**
*Prof K .R. Dunbar*
*TA: Ellen Song*

2. Define and cite examples of the different types of hydrogen-containing compounds that are discussed in this chapter, listing the distinguishing electronic, structural, and reactivity characteristics of each class.

- water - stable, extensive H-bonding. Interacts w/ charged or partially charged species, reactive towards certain metals and metal hydrides
- hydrates - compound in which water is one of the components
- clathrates - cage-like compounds ~~that~~ in which other molecules or atoms can be trapped
- hydrides - negatively charged H ~~molecule~~ atoms in a molecule

→ examples for diff types

for inorganic salts, → certain $H_2O$ molecules in a definite ratio as part of crystal

both ~~are~~ involve H-bonding networks. $H_2O$ can be easily removed upon heating, but that can cause a change to the original compound.

3. Water has several interesting properties that are needed for life as we know it. Three of these were discussed in class. List them and briefly mention why each is needed for life.

- high boiling point - need liquid water
- low density in solid form - need for aquatic life (freezes top down not bottom up)
- hydrogen bonding - holds everything together.

**CHEM 362 – Fall 2019**
*Prof K .R. Dunbar*
*TA: Ellen Song*

4. Is there a relationship between radius ratios and solubility? Explain

Recall that a consequence of small cation / large anion combinations is that the anhydrous salts are not stable as they prefer to have the cation surrounded by water

→ ↑ water solubility compared to salts w/ bigger cations

i.e. compare LiF to LiCl, and note the difference in radius ratio.

5. Compare and contrast (*and explain*) group IA alkali metals to group IIA alkali earth metals with respect to the following:

a. Atomic radii

G1A is larger, G IIA smaller b/c increased $Z_{eff}$

b. Melting point

G1A – lower
G1IA – higher

generally the stronger the bond, the higher the melting pt.

c. Density

G1A – lower
G2A – higher

d= m/volume

go L→R, higher atomic # = ↑ mass, size decreases b/c $Z_{eff}$

d. Ionization energy

G1A lower
G2A higher

IE increases going from L→R

e. Hydration energy

G1A – lower
G2A – higher

depends on charge density and charge / size ratio