Chemistry 2C: Review of Chapters 14 and 15 for the final

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1. For the main group elements, what are the general trends in the properties, and the formulæ of simple compounds (with H,with O, *etc.*)?
2. Describe the reactions of the alkali and alkaline earth metals with H_2O. What drives the trend in reactivity ? Why is Be impervious to attack by H_2O ?
3. Distinguish the C allotropes by structure and hybridization, and justify the distinct properties ? Why does Si not form in the structure of graphite ?
4. In the first four main groups, what are the trends in the following: Radii, ionization energy, electronegativity, and polarizability.
5. Distinguish polarizability and polarizing power. With which of these would you associate the term "floppy"? Which would you associate with a high charge:radius ratio ?
6. Why do melting points of alkali metals decrease as one goes down the row ?
7. What distinguishes $BeCl_2$ from, for example, $MgCl_2$, $CaCl_2$, and $SrCl_2$. Why ?
8. What are the formulæ of nitrates, sulfates, and phosphates of the alkali and alkaline earth elements.
9. What distinguishing feature of the chemistry of carbon allows it to be so rich ? (Answer: Homocatenation)
10. Which are the highest oxides of N, P, S, and Cl, and to which acids to they correspond (the acids produced upon hydration) ? Why do you think N and P are distinct in the acids they produce ?
11. Describe the reaction that has Cl_2 disproportionating to Cl^- and Cl^+ species in alkaline media. What are the products of this reaction commonly used for ?
12. Write a balanced equation for the reaction of Al and ammonium perchlorate NH_4ClO_4 giving rise to the oxide and chloride of Al, and water and NO. Why should this reaction be very exothermic?
13. How would you oxidize I to highest oxidation state ?
14. Why do the noble gases have the lowest melting and lowest boiling points of all the elements ?
15. Why are Kr and Xe the only noble gases to form stable compounds ?