Literature Discussion: In-Class Questions

Article: Danis, J. A.; Lin, M. R.; Scott, B. L.; Eichhorn, B. W.; and Runde, W. G. *Inorg. Chem.* **2001**, 40, 3389-3394.

Title: Coordination Trends in Alkali Metal Crown Ether Uranyl Halide Complexes: The Series $[A(Crown)]_2[UO_2X_4]$
Where A = Li, Na, K, and X = Cl, Br

1. What was the purpose of the crown ethers in the crystallization experiments carried out in this article, and why were different crown ethers used for the different Group I metals?

2. Explain whether 15-crown-5 would be similarly effective to stabilize a cation like cesium. Draw another molecule that might work towards that purpose.

3. Look at the bond distances in Table 1. Why is the U-O_{Ur} bond length in **6** significantly longer than the one in **5**?

4. Look at the structures you drew for compounds **1**-**6**. Using the concepts discussed in class on Wednesday, explain the trend in binding selectivity of the Group I metals to the uranyl compounds.

5. Let's say you managed to synthesize an analogous uranyl halide compound with the formula $[Na(15-crown-5)]_2[UO_2I_4]$. Draw what you would predict its structure to be.