

3.091 Fall Term 2009

Homework Quiz #3B

solution outline

- (a) Write the reaction that defines the electron affinity of bromine (Br).



- (b) Do you expect the value of the electron affinity of Br to be positive or negative? Explain by referring to electronic structure.

expect EA of Br to be **negative**, since Br has the electronic structure $4s^2 4p^5$ and is therefore 1 electron shy of noble gas octet stability and would profit by acquiring that last electron

- (c) Which of the following two compounds has the higher boiling point: MgO or MgS? Explain by referring to the relevant chemical bonding.

expect MgO to have the higher bp. Both are ionic compounds since they consist of a strongly electropositive element, Mg, and a strongly electronegative element, O or S. But the ionic radius of S^{2-} is larger than that of O^{2-} , so the coulombic force of attraction between Mg^{2+} and S^{2-} is expected to be weaker than that between Mg^{2+} and O^{2-} . Hence, the compound with the stronger ionic bond, MgO will have the higher bp.