Chapter 18 & 22 − Practice FRQ

Michael Brodskiy

Instructor: Mr. Morgan

May 4, 2020

2. (a) I_2 will have the greatest bond length because a single Iodine atom has the greatest atomic radius out of any of the other choices

   (b) $2\,Br^- + Cl_2 \longrightarrow 2\,Cl^- + Br_2$, where $E^0 = -1.07 + 1.36 = .29[V]$

   (c) BrCl is held together by London-Dispersion forces, as well as Dipole-Dipole forces, while Br_2 is held together only by London-Dispersion forces. Even though this is the case, Br_2 has a much more polarized electron cloud, which makes the bonds stronger than BrCl. In this manner, Br_2 has a higher boiling point.

   (d)

   $$P = \frac{nRT}{V}$$
   $$\frac{.1 \cdot .0821 \cdot 298}{2} = 1.22[\text{ATM}] \tag{1}$$

   (e)

   $$K_{eq} = \frac{[Br_2][Cl_2]}{[BrCl]^2} \tag{2}$$

   (f)

I	.1	0	0
C	$-2x$	x	x
E	.058	.021	.021

   $$\frac{(.0145)^2}{(.058)^2} = .13 \tag{3}$$

   (g) total = broken − made $\Rightarrow 1.6 = 2x - 193 - 243 \Rightarrow x = 219[\text{kJ}]$