

Revised August 2011

## HONORS WORKSHEET 10b: Born-Haber Cycles

1. By constructing Born-Haber cycles or another method, use the data in the table below to calculate the enthalpy of formation of potassium bromide and magnesium chloride. (8)

All values in $\text{kJ mol}^{-1}$	K	Mg	Br	Cl	KBr	$\text{MgCl}_2$
$\Delta H_a$	+90.00	+150.0	+112.0	+121.0		
$\Delta H_{i(1)}$	+418.0	+736.0				
$\Delta H_{i(2)}$	+3070.	+1450.				
$\Delta H_e$			-342.0	-364.0		
$\Delta H_f$					-670.0	-2493

2. Considering *only* the ionization energies of potassium, explain why K does not form  $\text{KF}_2$  or  $\text{KF}_3$ ? (2)



3. Write chemical equations to show the following processes. (14)
- (a) The first ionization of strontium
  - (b) The second ionization energy of strontium
  - (c) The first electron affinity for fluorine
  - (d) The atomization of strontium
  - (e) The atomization of fluorine
  - (f) The enthalpy of formation of strontium fluoride
  - (g) The lattice enthalpy of strontium fluoride
4. Sometimes the calculated value and the theoretical value of lattice energies for a particular compound do not match well. Explain why. (2)