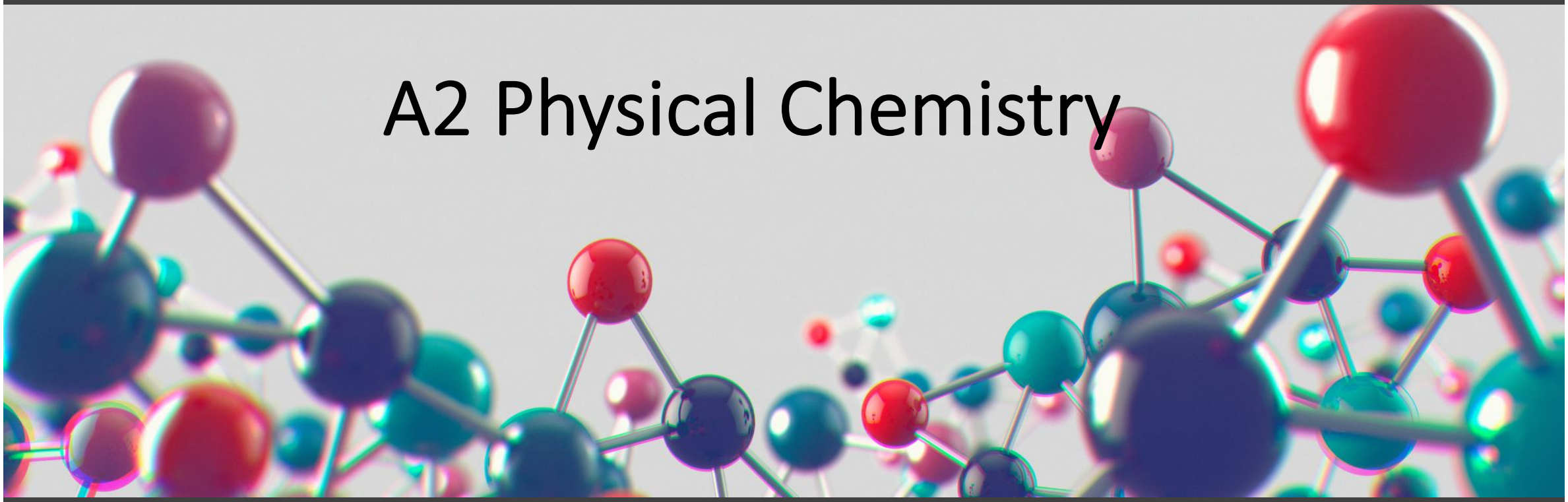

A2 Physical Chemistry

Lattice Enthalpy of $MgCl_2$

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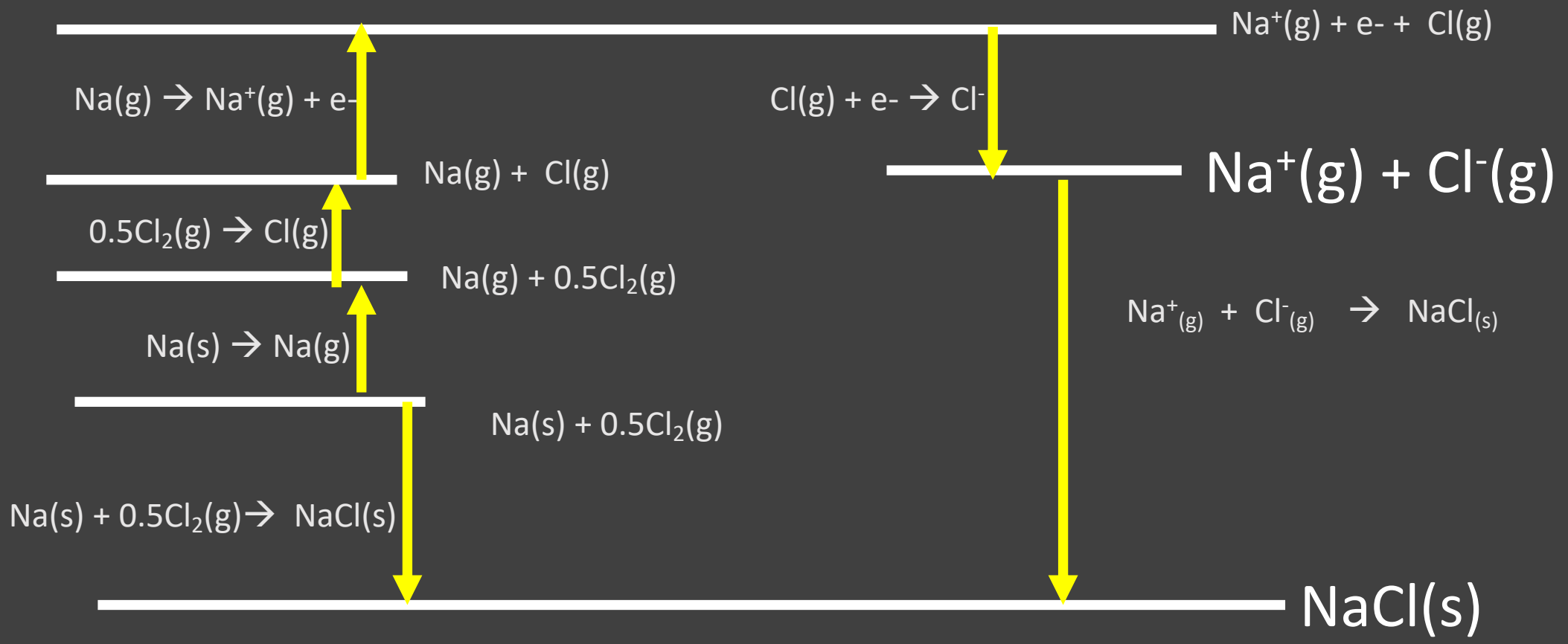
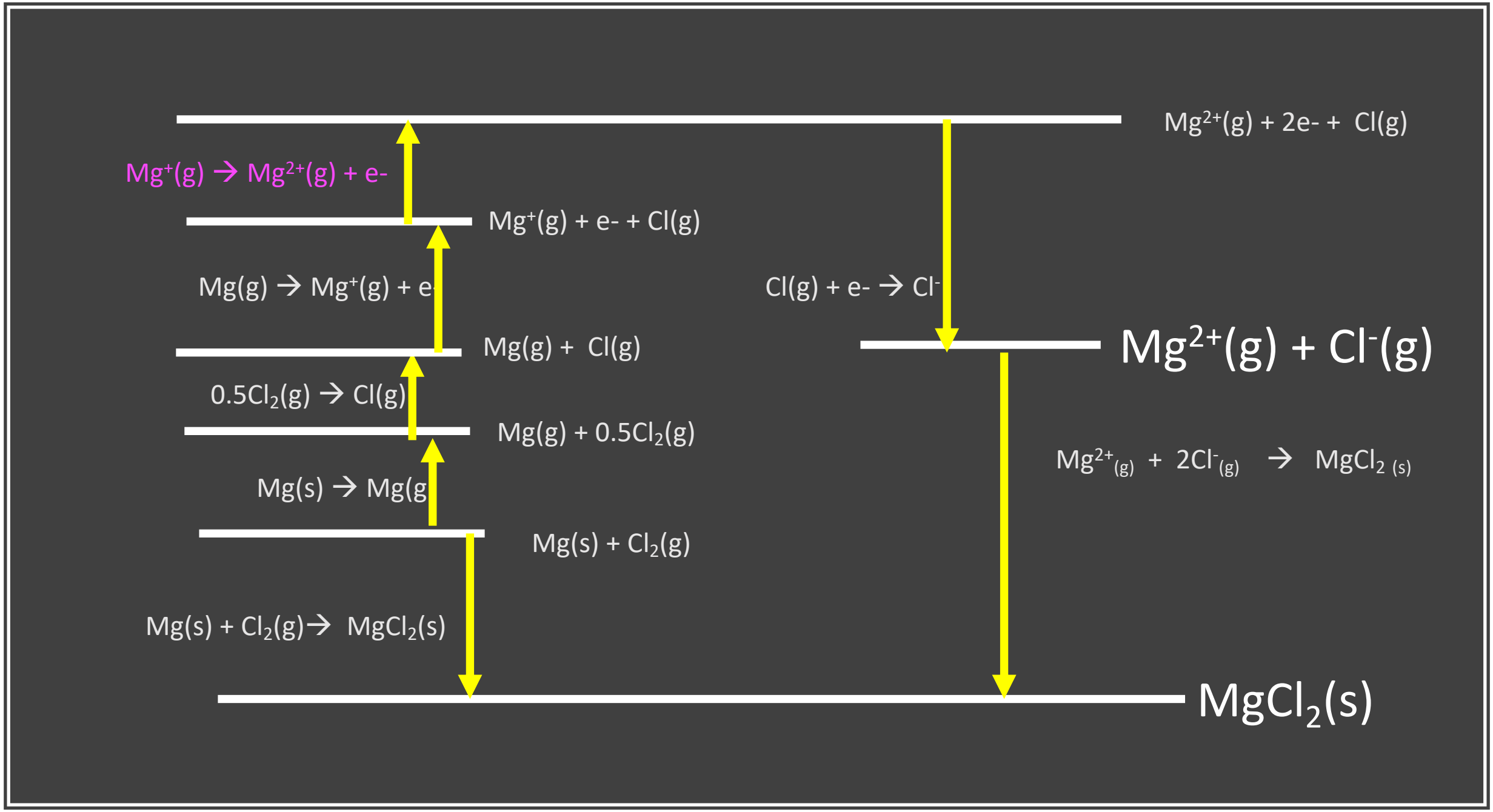
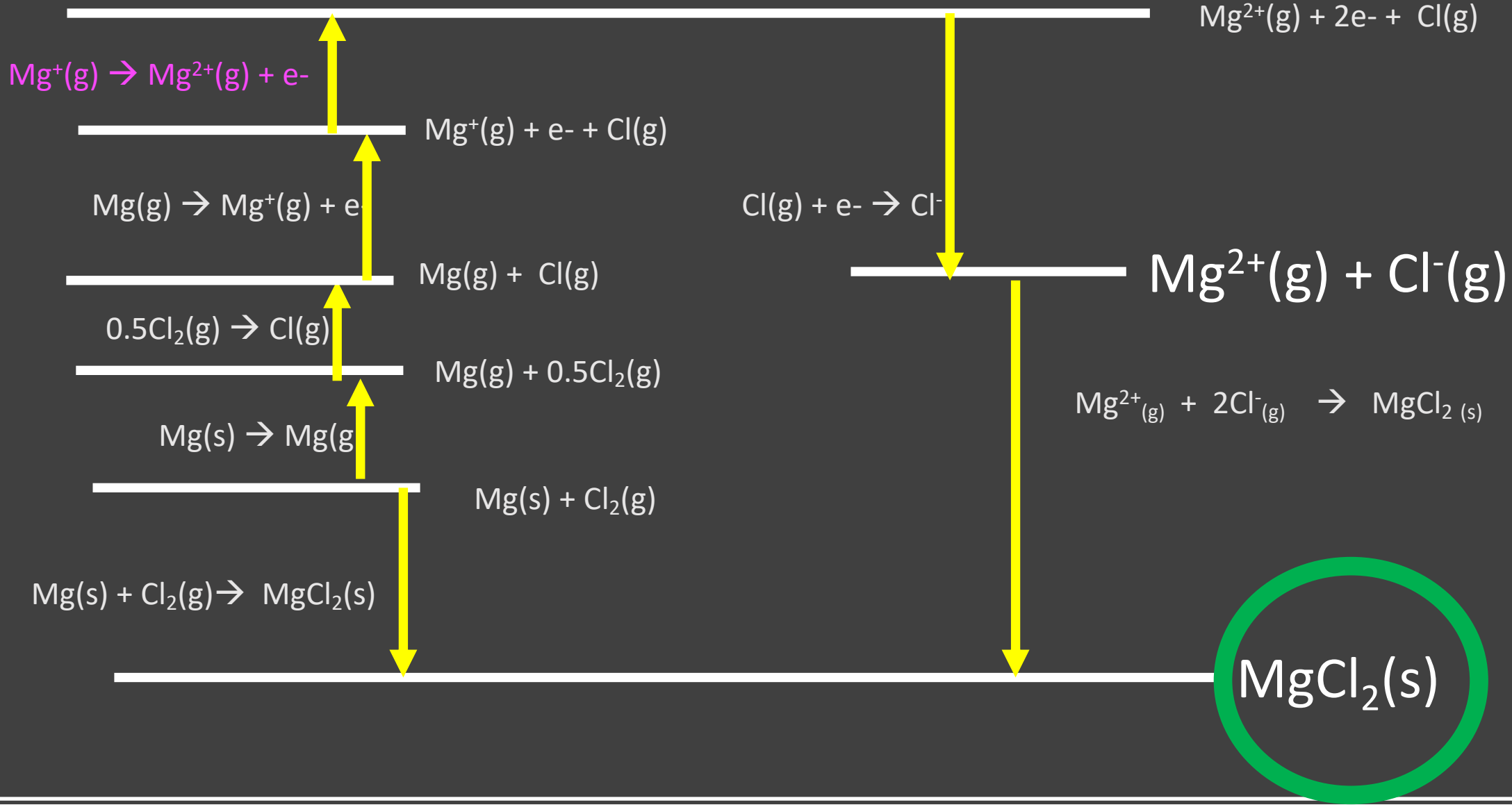
We can easily modify this diagram for $MgCl_2$ by making two changes.
The first is changing Na^+ to Mg^{2+} which needs to include the second ionization energy of Mg.




$Mg^{+}(g) \rightarrow Mg^{2+}(g) + e^-$
$Mg^{+}(g) + e^- + Cl(g)$
$Mg(g) \rightarrow Mg^{+}(g) + e^-$
$Mg(g) + Cl(g)$
$0.5Cl_2(g) \rightarrow Cl(g)$
$Mg(g) + 0.5Cl_2(g)$
$Mg(s) \rightarrow Mg(g$
$Mg(s) + Cl_2(g)$
$Mg(s) + Cl_2(g) \rightarrow MgCl_2(s)$
$Mg^{2+}(g) + 2e^- + Cl(g)$
$Cl(g) + e^- \rightarrow Cl^-$
$Mg^{2+}(g) + Cl^-(g)$
$Mg^{2+}_{(g)} + 2Cl^-_{(g)} \rightarrow MgCl_{2\,(s)}$
$MgCl_2(s)$

The second change is multiplying the enthalpy changes for Cl by 2 since there are two Cl^- ions in the compound.



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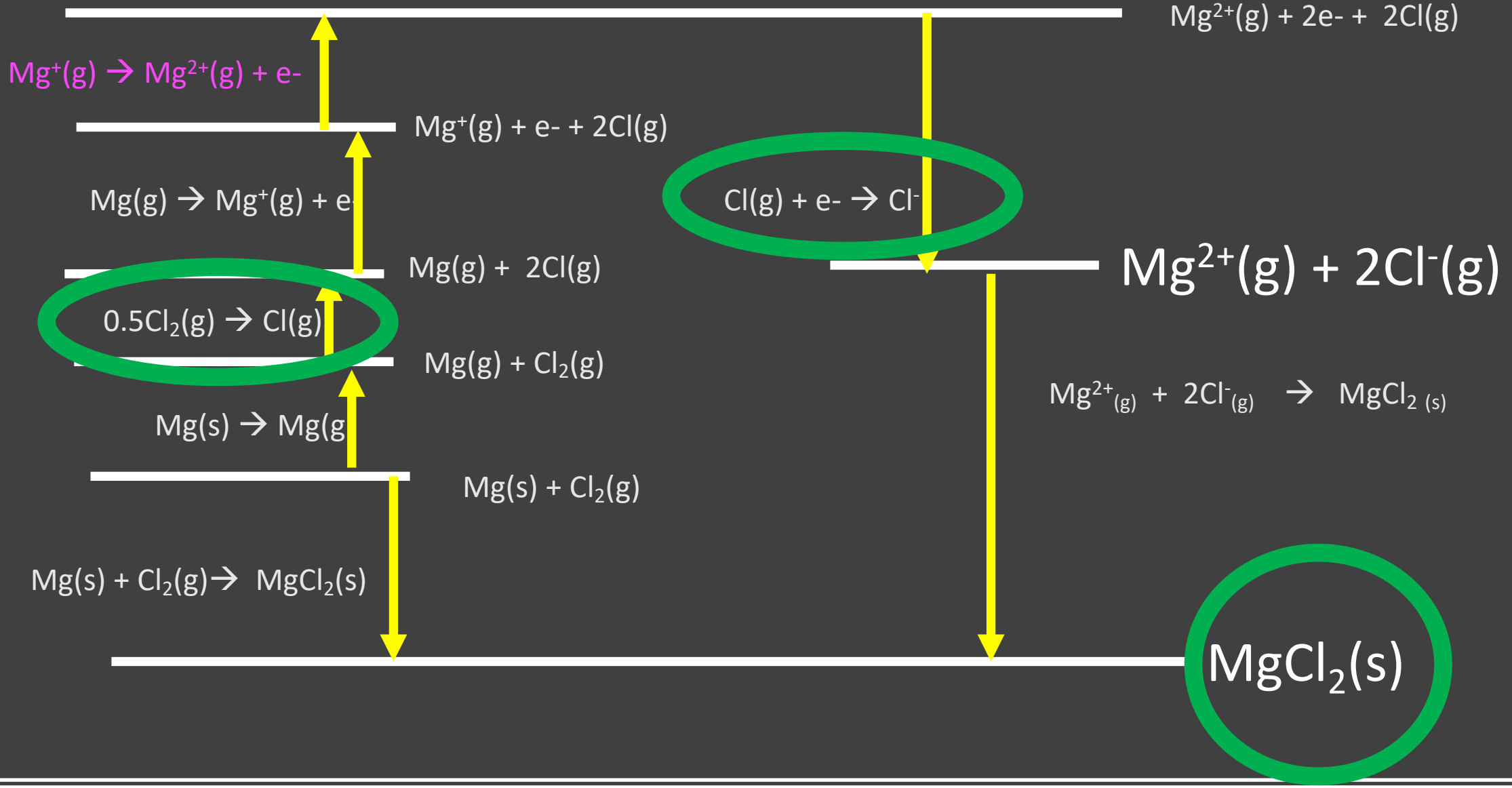

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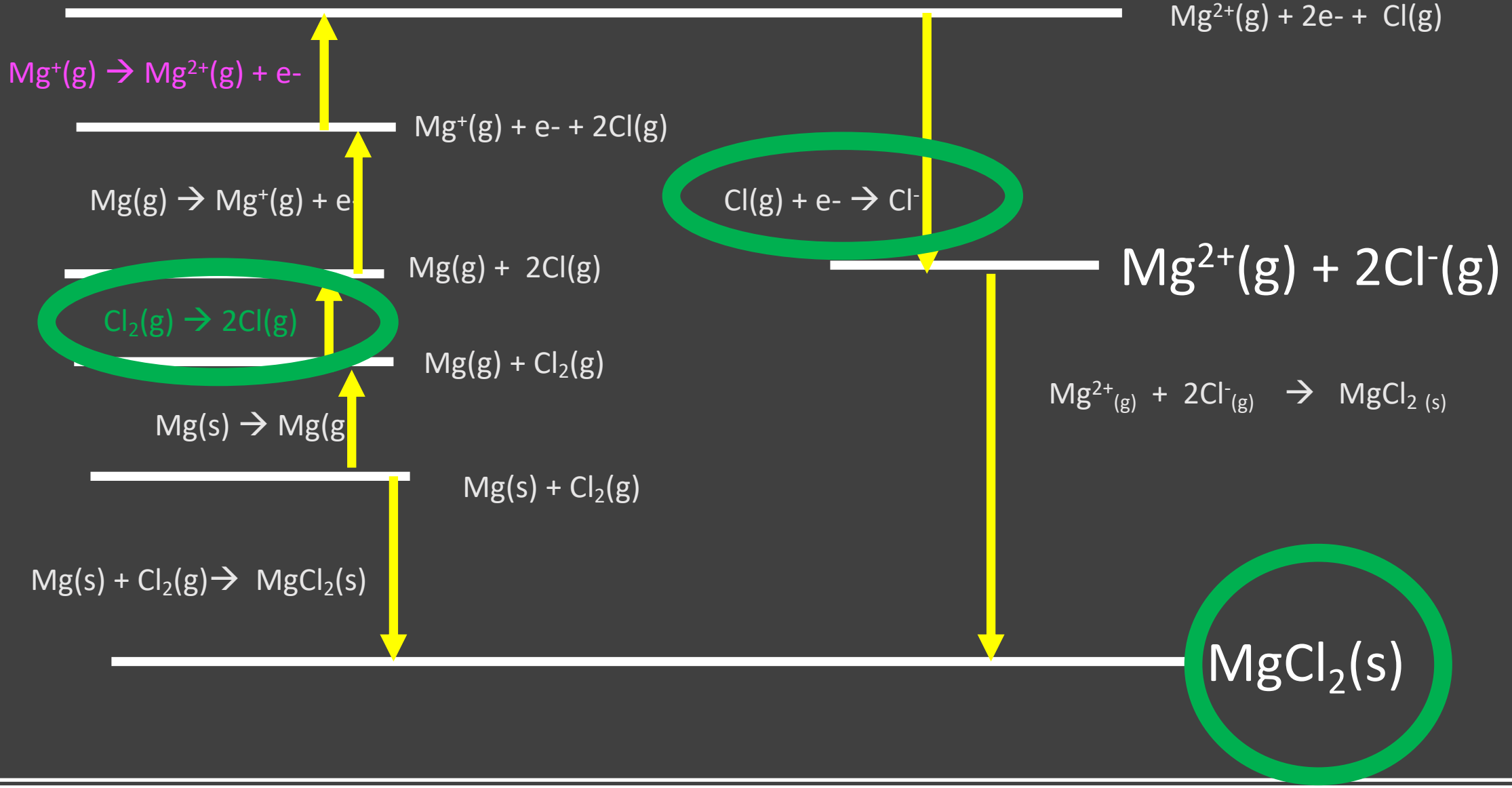

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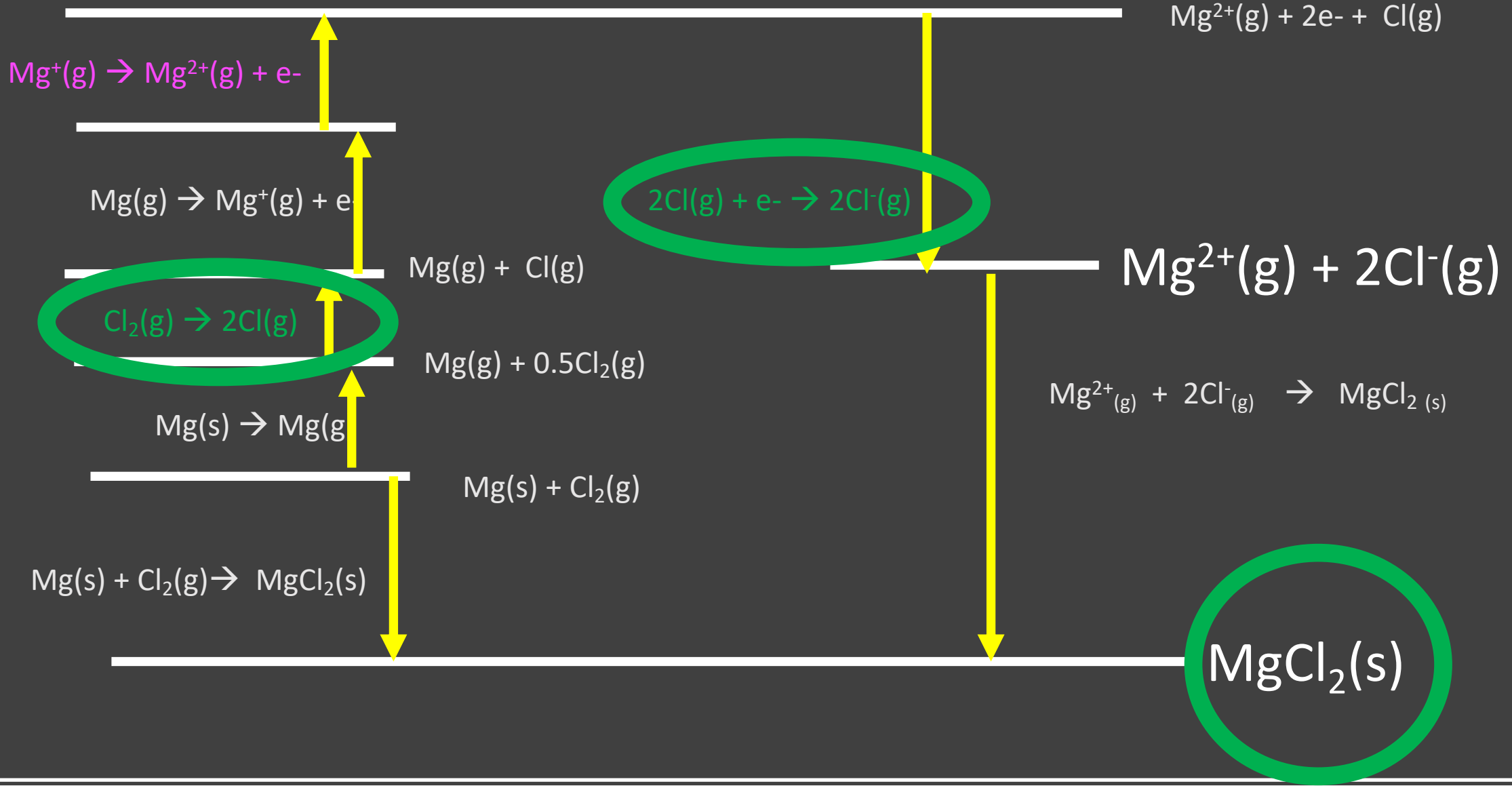

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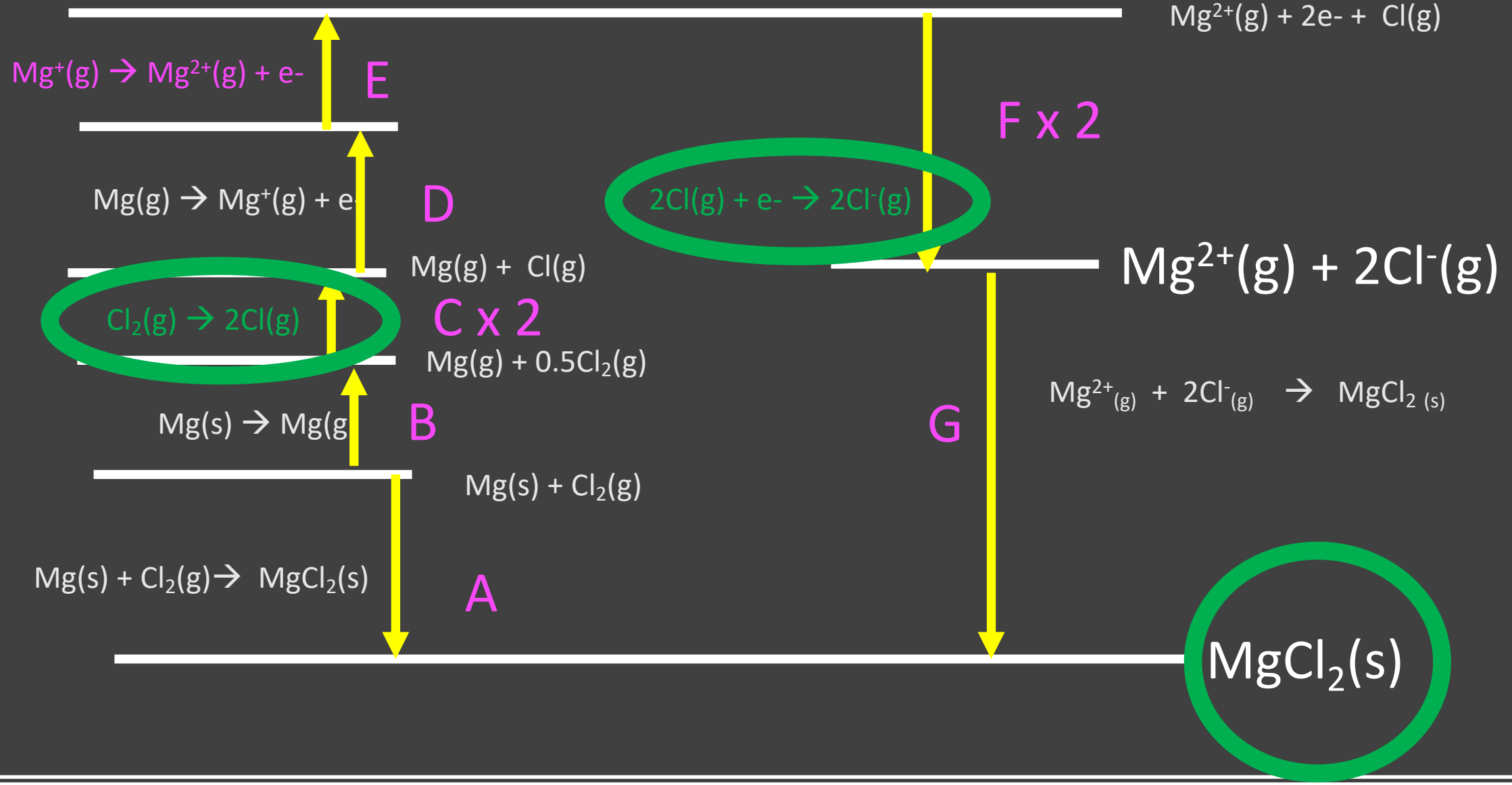

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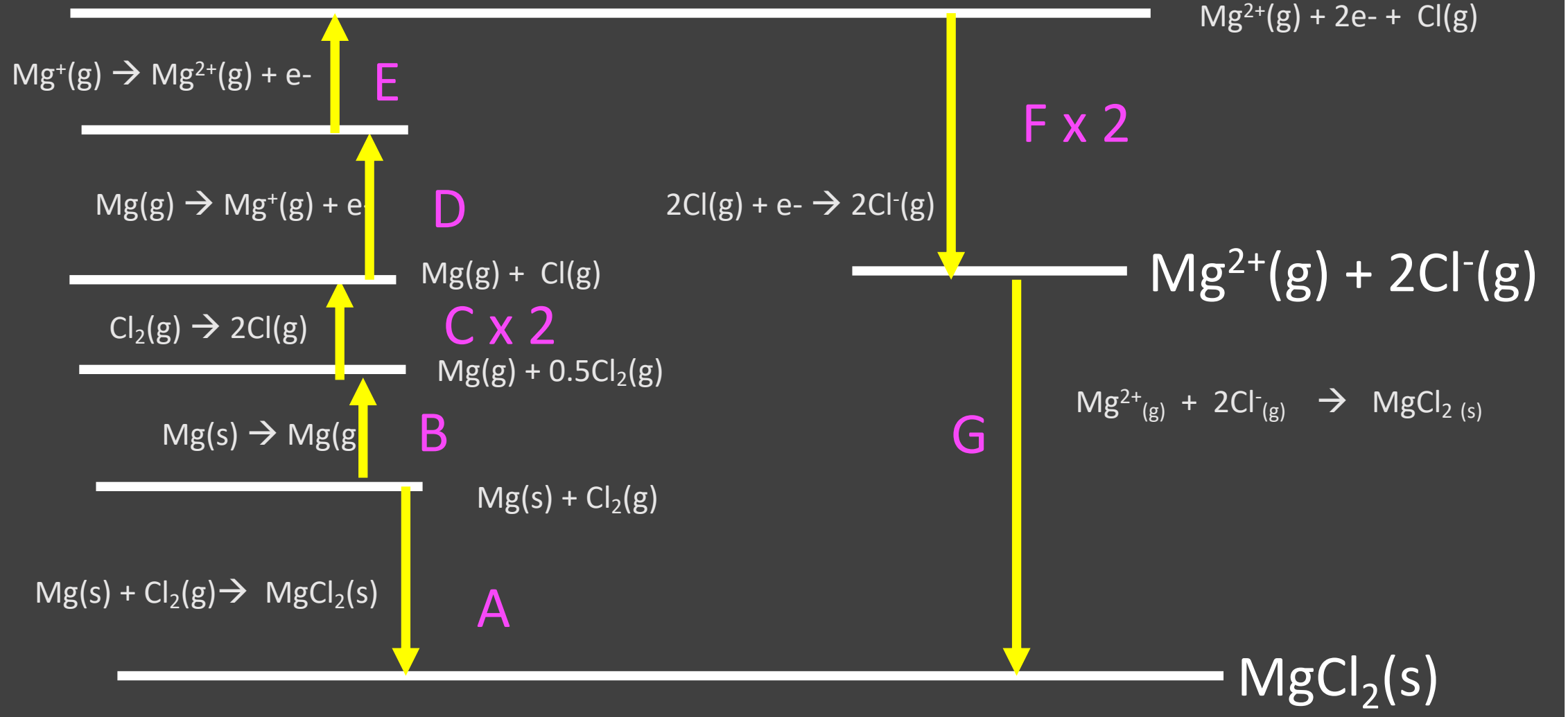

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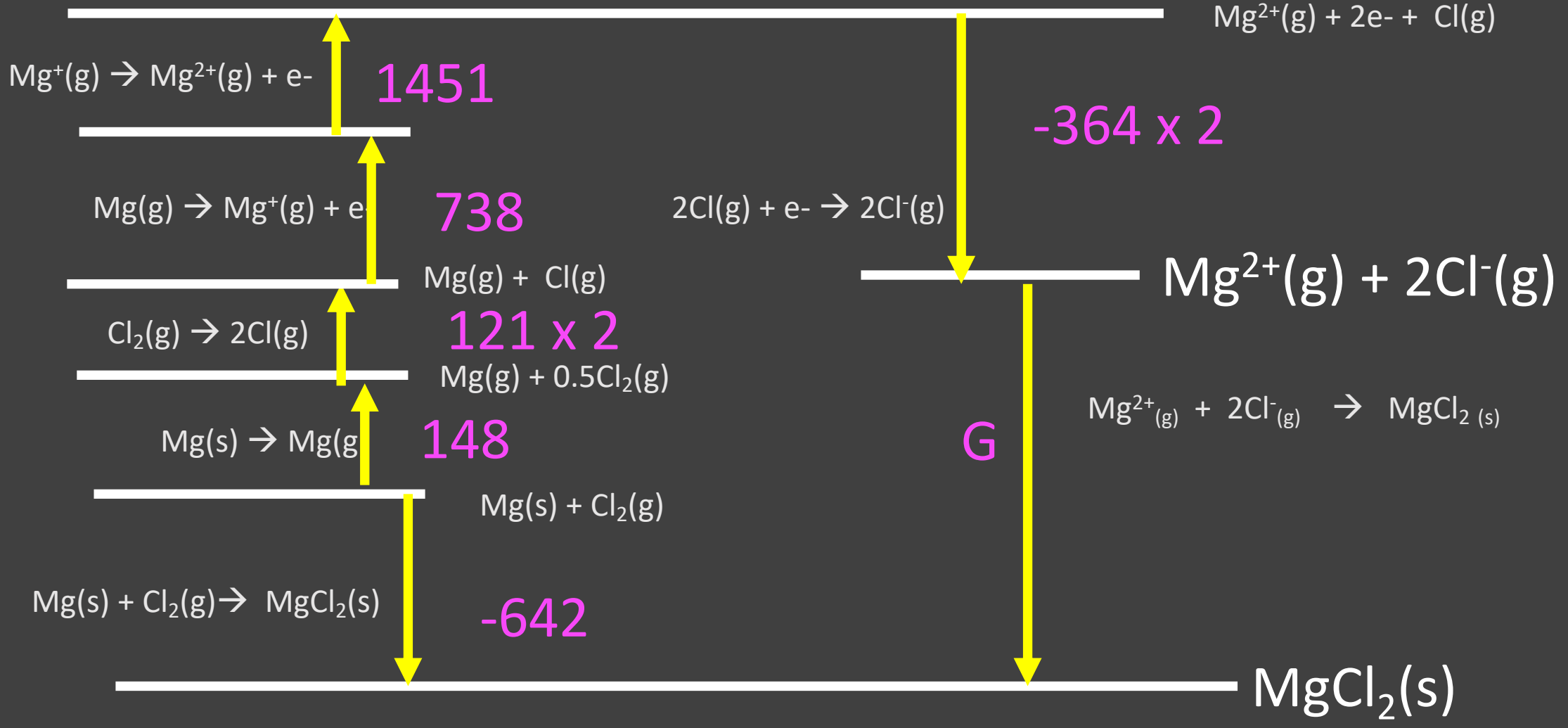

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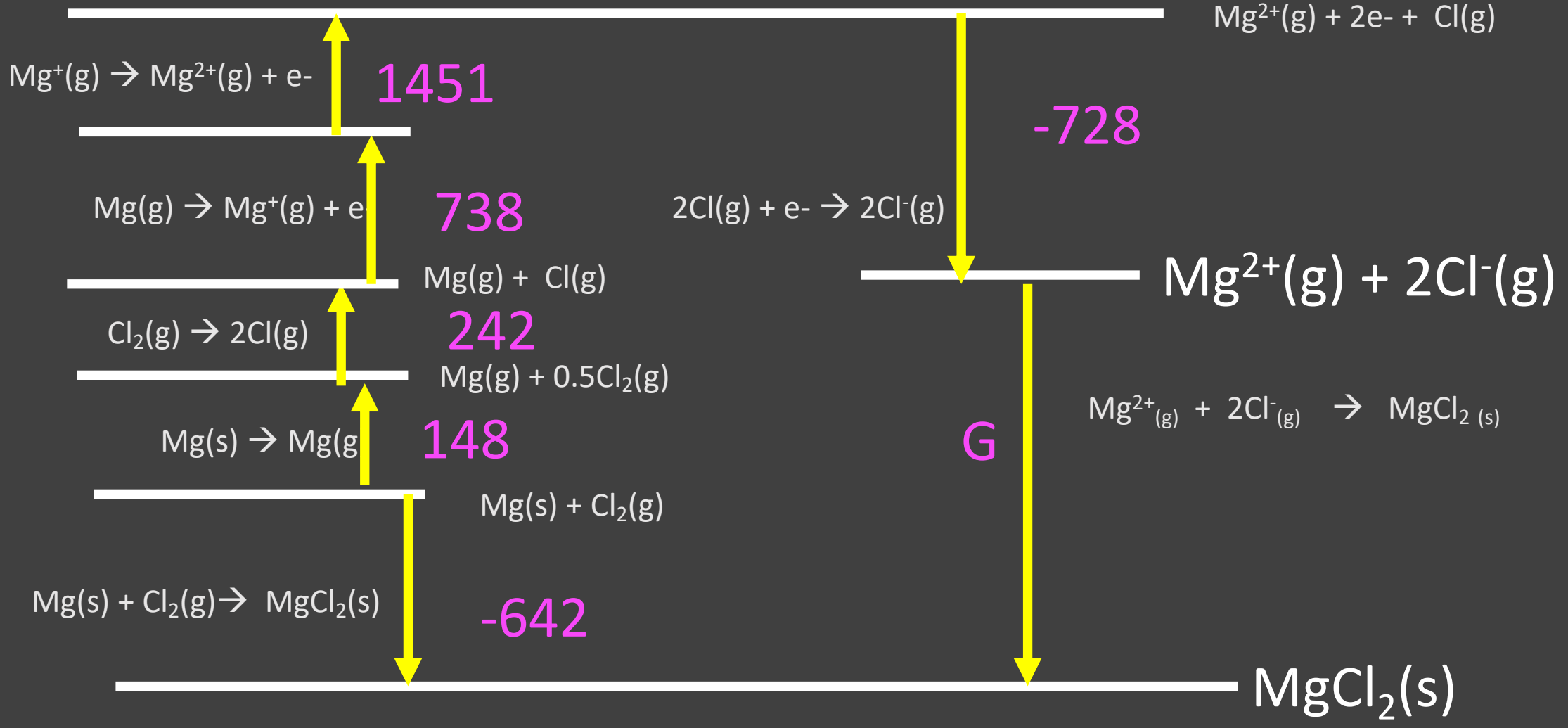

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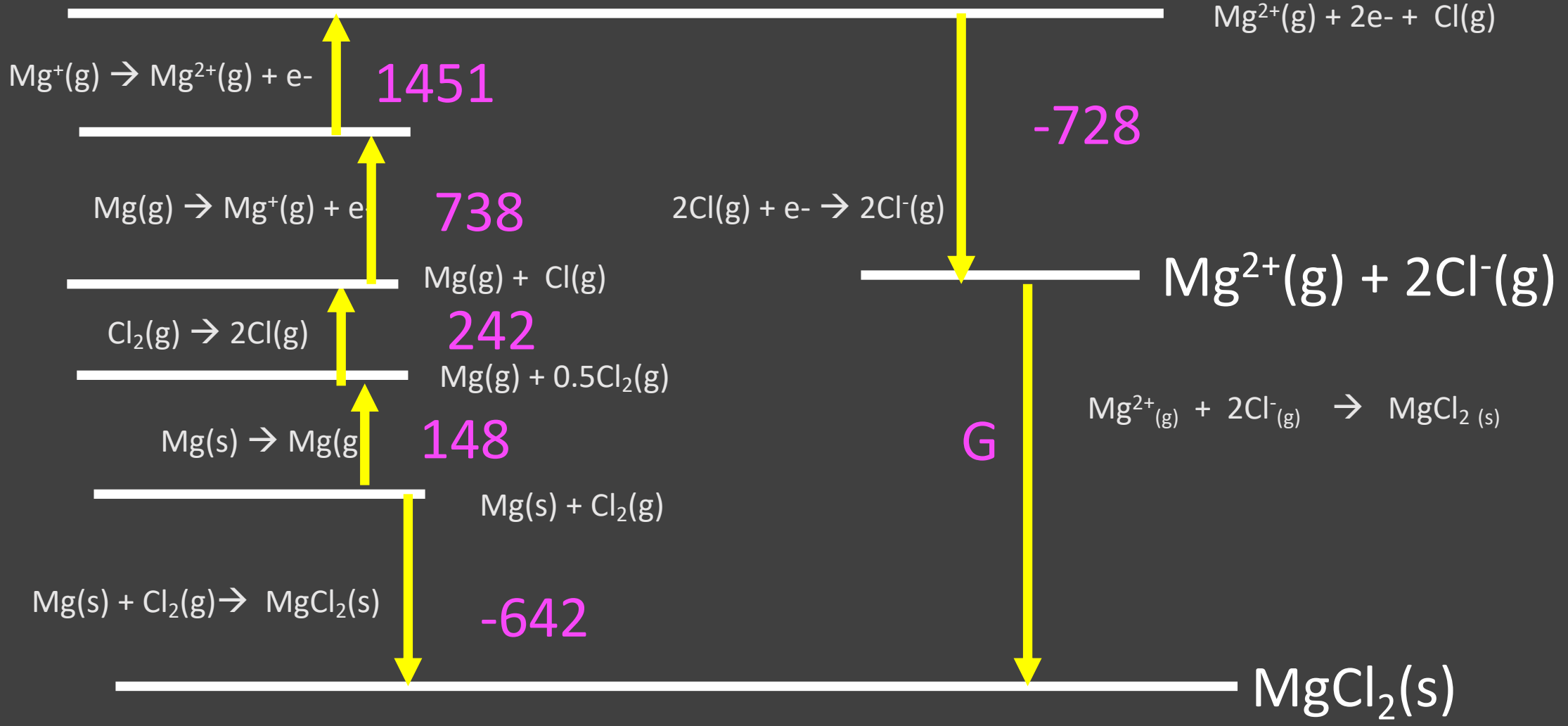
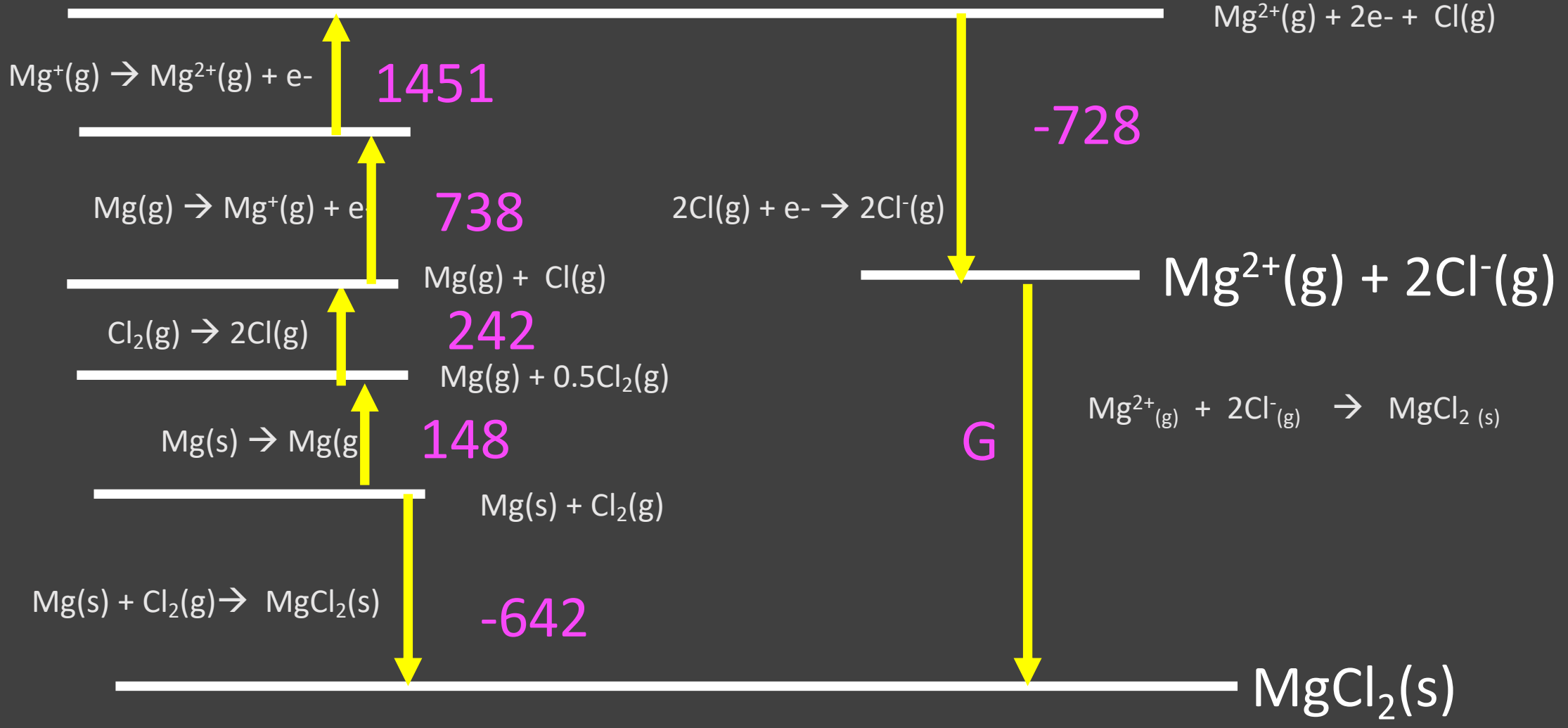


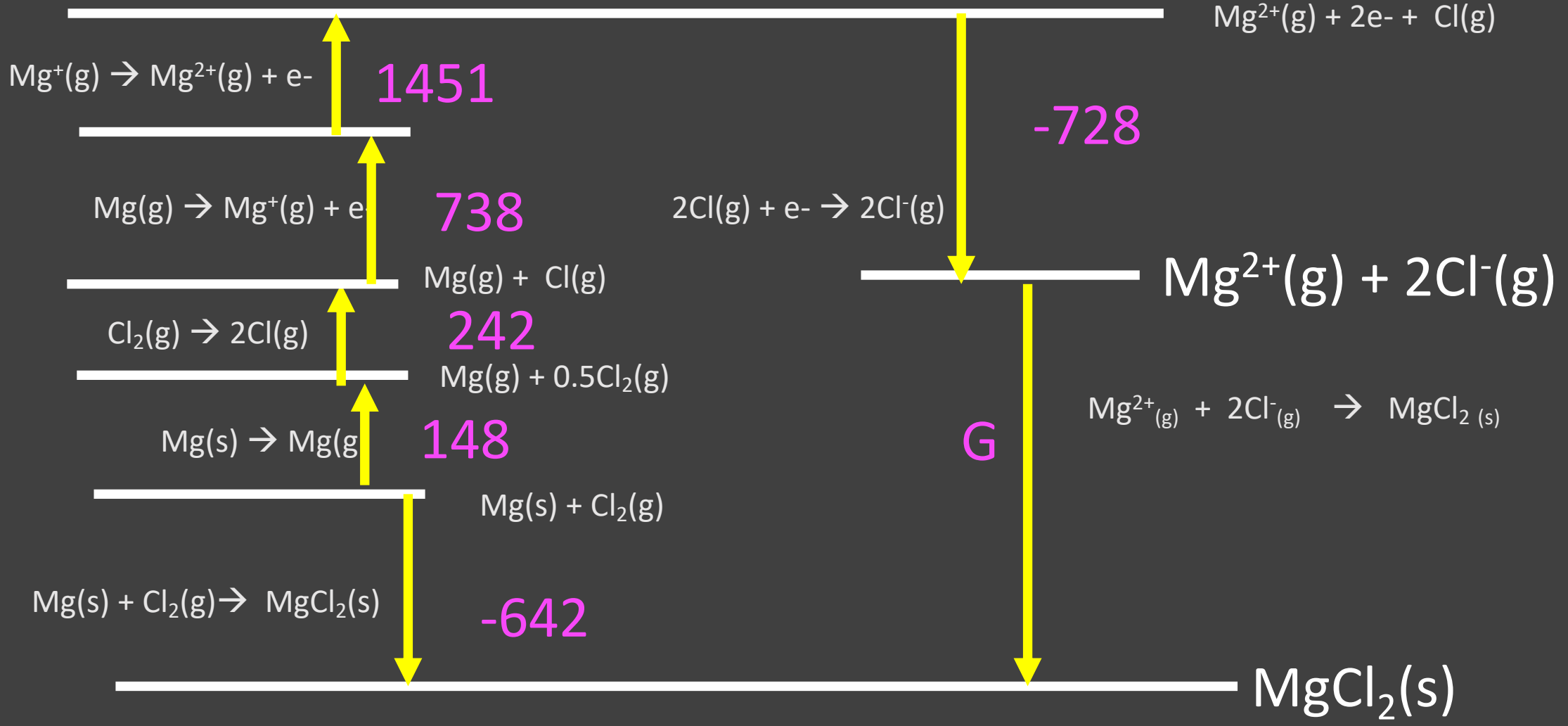
Lattice Enthalpy = -642 – (148 + 242 + 738 +1451 -728)

The second change is multiplying the enthalpy changes for Cl by 2 since there are two Cl^- ions in the compound.



Lattice Enthalpy = -642 – 1851

The second change is multiplying the enthalpy changes for Cl by 2 since there are two Cl^- ions in the compound.



Lattice Enthalpy = -2493 kJ mol^{-1}