

GEOL 3010

EXCEL

Prob Set 8

This problem set will guide you through making a spreadsheet to calculate mineral chemical analyses from weight percent to atoms per given number of oxygen atoms. This will be useful for the major rock-forming mineral groups.

Open the Excel spreadsheet.

In column 1, starting in row #3, are the names of the oxides: SiO₂, TiO₂, Al₂O₃, Cr₂O₃, Fe₂O₃, FeO, MnO, MgO, CaO, Na₂O, K₂O, H₂O and Total.

Then there is a blank row and then "Rel Oxygens", and "Oxygens PFU".

In col 1 rows 20 - 31 are the element names "Si, Ti, Al, Cr, Fe³⁺, Fe²⁺, Mn, Mg, Ca, Na, K, H."

In column 2 are the correct answers (but not the formulas) for the calculation for column 3, so don't overwrite these.

In column 3, row 16 (Total) enter the formula '=sum(b3:b14)' This should total the numbers of oxide weight percents. This should calculate the summation of rows 3-14 for that column.

In column 3 row 17 (Rel oxygens) enter the formula: '=2*(b3/60.086)+2*(b4/79.8988)+3*(b5/101.963)+3*(b6/151.9974)+.....' and so on through all the listed oxides to get the total relative mole numbers of oxygens. The oxide molecular weights are listed below. Your number should match exactly that in column 2.

In column 3, row 19 (Oxygens PFU) are listed the number of oxygens in the formula unit for each mineral. You can change this at will and the spreadsheet will recalculate your analyses.

In column 3 row 20, enter the formula: '= (b19/b17)*(b3/60.086)'. This should give the number of Si atoms per formula unit. This should match the number in column 2.

In column 3 row 21, enter the formula: '= (b19/b17)*(b4/79.8988)'. This should give the number of Ti atoms per formula unit.

In column 3 row 22, enter the formula: '= (b19/b17)*(b5/101.963)*2'. This should give the number of Al atoms per formula unit. Note that you need to multiply by two because of the subscript of Al in Al₂O₃.

Do this for each element to get the numbers of cations of each element for the formula unit. Your numbers should match those in column 2. Make sure you have multiplied by two where required so your answers match those in column 2.

Now copy and paste your formulas through the spreadsheet. (Highlight the cells you want to copy and press the copy button. Then highlight the cells you want them pasted to and press the paste button. Note that there are five total sheets of analyses indicated by the little tabs at the bottom. You can copy and paste your formulas through all five sheets. Please keep the number of oxygens PFU for each analysis.

Listed below are the molecular weights of the oxides and atomic weights of the elements.

<u>Oxide</u>	<u>MolWtOxide</u>	<u>Element</u>	<u>AtomicWeight</u>
SiO ₂	60.086	Si	28.087
TiO ₂	79.8988	Ti	47.90
Al ₂ O ₃	101.963	Al	26.9824
Cr ₂ O ₃	151.9974	Cr	51.9996
Fe ₂ O ₃	159.6922	Fe	55.847
FeO	71.8464	Fe	55.847
MgO	40.3114	Mg	24.312
MnO	70.9374	Mn	54.938
CaO	55.96	Ca	39.961
Na ₂ O	61.980	Na	22.9809
K ₂ O	94.2032	K	39.102
H ₂ O	18.0153	H	21.008
		O	15.9994
