

UNIVERSITY OF PRETORIA
GLY 251 – CRYSTAL CHEMISTRY AND OPTICS
1. Semester test - second attempt**Practical questions**MOLECULAR
WEIGHTS

SiO ₂	60.084
Al ₂ O ₃	101.961
CaO	56.077
Na ₂ O	61.979
K ₂ O	94.195
FeO	71.85
MgO	40.3
CaO	56.077
TiO ₂	79.88
ZrO ₂	123.222

$$Ca = 40.078$$

$$Zr = 91.224$$

- 1 A mineral gives the analysis

	Wt%
SiO ₂	43.550
Al ₂ O ₃	34.660
CaO	4.440
Na ₂ O	12.090
K ₂ O	4.870
TOTAL	99.610

$$Can Na_{1-x} K_x Si_{2-x} O_8$$

$$x (Ca + Na + K) Al_2 SiO_9$$

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A friend claims that this is obviously feldspar – all the elements are there. Another friend reckons that one has to be careful and reminds of the similarities between leucite (theoretically $KAlSi_2O_6$) and K-feldspar in terms of elements present and the fact that substitutions could easily have happened. I think both are making the mistake of not calculating and checking. Does this analysis fit the formula for feldspar, leucite, or is it even something else? Use your calculated mineral formulas to discuss. [20]

- 2 Högbomite is a rare oxide mineral but I found an analysis. If I only could remember whether this is a spinel. Convince me with a
- complete**
- evaluation. [15]

	Wt%
Al ₂ O ₃	56.200
FeO	35.400
MgO	7.800
TOTAL	99.400

- 3 Zirconolite is
- $CaZrTi_2O_7$
- . What is the concentration (in wt-%) of the element zirconium? [15]