

Chapter 18. F--- Expansion Words

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18.1. Background

A language like Nwehu Nuswei (NN) which is fully determined by a pre-ordained system with pre-defined vocabulary would be in big trouble if it had no provisions for expansion and change. One of the main mechanisms for allowing NN to expand is the FAMILY of words beginning with λ --- F---. This is explained in “Nwehu Nuswei Overview” as follows:

If a group of specialists needs more words than are allocated in the predefined NN lexicon, they can get together and develop a vocabulary of their own. They could start with one or more words in the predefined NN lexicon – a word that represents the area upon which they want to expand, for example, Γ Ψ Γ *Rwhu* ‘electronics’. After organizing the electronic devices they are focused on and assigning words beginning with λ F to each class and sub-class of device, these devices can be referred to using the compound-word such as Γ Ψ Γ - λ Γ Γ Δ *Rwhu-fane*.

As a proof-of-concept, the classification of minerals was undertaken, using the existing Nickel-Strunz system as the authoritative classification system. The FAMILY beginning with χ --- D--- represents ‘Inorganic natural phenomena’, with GENUS χ Ψ Ψ *Dw--* representing ‘Minerology’. To pick a mineral at random, ‘Eugenite’ (Ag₁₁Hg₂, Nickel-Strunz code 1.AD.15c) uses the base-word χ Ψ Δ *dwxe-* ‘metals and intermetallic alloys, sub-series 1.AD, Mercury-amalgam family’ followed by λ Δ Δ *feyai* as part of an ordinal sequence of sounds based on the NickelStrunz Code. Thus χ Ψ Δ - λ Δ Δ *dwxe-feyai* is the NN term for ‘Eugenite’.

Discussion

The Minerology GENUS was partially populated primarily as an example of how NN can accommodate a large corpus of technical terminology using the F--- family to expand vocabulary.

Each set of F--- words assumes a meaning only by combining a predefined NN word (HEADWORD) with a definition provided by the appropriate technical or academic authority. Minerology is used to illustrate two possible ways in which pre-assigned meanings are associated with technical terminology. The technical classification of minerals is based on the “Nickel-Strunz” (N-S) 10th edition system, maintained by Mindat.org, an outreach of the Hudson Institute of Minerology (<https://www.mindat.org/>). Information about Nickel-Strunz Classification is given at <https://www.mindat.org/strunz.php>, and definitions of “Mineral” at https://www.mindat.org/a/what_is_a_mineral.

Perhaps the simplest method for assigning technical vocabulary to $\lambda---$ F--- family words would be to start with λ_{III} *Fuhu* and assign each word arbitrarily in sequence.

More in keeping with the NN goal of making learning as easy as possible, two techniques are presented: “Expansion Plan 1” which may make learning the resulting terms easier, and “Expansion Plan 2” which accommodates a larger technical vocabulary. Both will be explained and illustrated here. Having experimented with both plans, Expansion Plan 2 is recommended for large sets of technical terms like mineralogy. The “Expansion Template” in the Templates folder makes a generalized form available for both. The following explains the general considerations and details of Expansion Plan 1.

18.1.1. Primary Family $\mathcal{X}---$ D--- and Species \mathcal{X}_{q--} Dw--.

As mentioned, expansion words are created from a pre-defined base word followed by words chosen from the $\lambda---$ F--- FAMILY. In the proof-of-concept exercise, the $\mathcal{X}---$ D--- FAMILY and \mathcal{X}_{q--} Dw-- GENUS were chosen. A brief overview of the FAMILY and GENI may be helpful to understand the system.

The $\mathcal{X}---$ D--- FAMILY is only partially populated (8 of 16 GENI) as follows: Inorganic General, Commonly Used Substances, Metallurgy, Metal Alloys, Ceramics and Glass, Semiconductors, Mineralogy, Composite Materials.

The Nickel-Strunz (N-S) system used in populating \mathcal{X}_{q--} Dw-- GENUS classifies minerals at four levels: Class, Subclass, Group, and Series. Each of the 9 N-S Classes is assigned a SPECIES within the \mathcal{X}_{q--} Dw-- GENUS, except Class 10, “Silicates and Germanates”, which was divided between two GENI. The result is charted in \mathcal{D}_p 18.1.

18.1.1.1. \mathcal{X}_{c} -- D_{w} -- Minerology

Roman	IPA	NN	Semantics
<i>dwh-</i>	duh	\mathcal{X}_{cI}	Minerology: Principles and Concepts
<i>dwx-</i>	duʃ	\mathcal{X}_{cL}	Nickel–Strunz class 01: Native Elements
<i>dws-</i>	dus	\mathcal{X}_{cJ}	Nickel–Strunz class 02: Sulfides and Sulfosalts
<i>dwf-</i>	duf	\mathcal{X}_{cL}	Nickel–Strunz class 03: Halogenides
<i>dwr-</i>	duɹ	\mathcal{X}_{cT}	Nickel–Strunz class 04: Oxides
<i>dwy-</i>	duz	\mathcal{X}_{cC}	Nickel–Strunz class 05: Carbonates and Nitrates
<i>dwn-</i>	dun	\mathcal{X}_{cN}	Nickel–Strunz class 06: Borates
<i>dwm-</i>	dum	\mathcal{X}_{cL}	Nickel–Strunz class 07: Sulfates, Selenates, Tellurates
<i>dwk-</i>	duk	\mathcal{X}_{cV}	Nickel–Strunz class 08: Phosphates, Arsenates, Vanadates
<i>dwc-</i>	duʦ	\mathcal{X}_{cL}	Nickel–Strunz class 09: Silicates and Germanates, Part 1
<i>dwt-</i>	dut	\mathcal{X}_{cY}	Nickel–Strunz class 10: Organic Compounds
<i>dwp-</i>	dup	\mathcal{X}_{cL}	reserved
<i>dwg-</i>	dug	\mathcal{X}_{cT}	reserved
<i>dwj-</i>	dudʒ	\mathcal{X}_{cC}	Nickel–Strunz class 09: Silicates and Germanates, Part 2
<i>dwd-</i>	dud	\mathcal{X}_{cK}	reserved
<i>dwb-</i>	dub	\mathcal{X}_{cK}	Common Minerals and Gemstones: Popular Names

Dp 18.1: Minerology Words

18.2. Expansion Plan 1

18.2.1. Plan 1 System

First: in the primary FAMILY assignments (GENUS \mathcal{X}_{c} -- D_{w} -- words), one SPECIES (\mathcal{X}_{cI} - D_{wh} -) is assigned for general minerology concepts, and the three SPECIES not needed are “reserved” (unassigned). The reserved SPECIES can be used for expansion or in case of additions to the N-S top-level categories; this was done with SPECIES \mathcal{X}_{cC} - D_{wj} - which expands N-S Classes in SPECIES \mathcal{X}_{cL} - D_{wc} -. (Note that two unused species were skipped \mathcal{X}_{cY} - D_{wt} - and \mathcal{X}_{cL} - D_{wp} -. This follows the general NN practice of assigning related concepts to SPECIES with the same place and manner of articulation. Consonants c and c_j are both palatal obstruants,

differing only in voicing – this preserves the majority of the sound-meaning relationship; the letters (glyphs) are also similar.)

Next: the second-level classifications, known as a “Series” in the N-S nomenclature, is distributed within each SPECIES of $\mathcal{X}_{q--} Dw--$. Since all N-S top level categories have fewer than 16 Subcategories, this is simple and convenient...in this case. In other classification systems, other strategies would be required. As much as possible, simpler vowels and combinations are assigned to the sub-categories.

In the N-S system, all second-level sub-scateries are groups of items, rather than individual minerals. Thus each $\mathcal{X}_{q--} Dw--$ word is the name of a “Series” rather than the name of a mineral.

Below the Series level, the N-S system has a third sub-category level which they refer to as a “Family” (not to be confused with an NN FAMILY). In Expansion Plan 1, each of these is assigned an F--- word in which the second vowel echos the final vowel of the $\mathcal{X}_{q--} Dw--$ word to which it will be attached – this “echo” is intended to make learning and pronunciation simpler.

Using Plan 1, each mineral Family is represented by the NN HEADWORD (ex. $\mathcal{X}_{qLd} Dwxe$) followed by an F--- word with the same first vowel as the HEADWORD’s last vowel; the second expansion-word consonant is assigned in sequence for each mineral Family; and the final vowel is zero $\uparrow u$.

Head-word C1V1 C2V2↓-

F--- word C3V2 C4Vu

Ex: the Copper-Cupalite family is represented by NN

\mathcal{X}_q $Ld-$ Dw $xe-$
 Ld L^\uparrow fe xu .

Op 18.2 “F- Expansion Table” also illustrates the method for constructing the first expansion word for a headword using Plan 1.

F- Expansion Table

First Expansion Word for this species:

Letter	1	f	3	4096	12288
Letter	2	e	2	256	512
Letter	3	h	0	16	0
Letter	4	i	1	0	1
Word		fehi			12801

Dp 18.2: F- Expansion Table for Plan 1

(Lexical File "E8 Dw-.ods" tab "--x-" title "Nickel-Strunz class 01: Native Elements", Expansion Plan 1)

Finally: in Plan 1, individual minerals receive the name of the primary series (ex. $\mathcal{X}\mathcal{C}\mathcal{L}\mathcal{d}$ *Dwxe*); with an F--- word whose final vowel is assigned in numerical sequence to each mineral in the “family”. In the example below, each Series listing is followed by a Family listing displaying the NN two-word name for each mineral in the family. Ex: the first mineral in the copper-cupalite family is ‘native aluminum’, represented by NN $\mathcal{X}\mathcal{C}\mathcal{L}\mathcal{d}\text{-}\mathcal{L}\mathcal{d}\mathcal{L}\mathcal{L}$ *dwxe-fexi*.

When a Family has more than 16 minerals, as is the case in the Copper-Cupalite family, two series of F--- words are used in Plan 1. Ex: Copper-Cupalite part 1: $\text{-}\mathcal{L}\mathcal{d}\mathcal{L}\mathcal{L}$ *-fexi* ‘aluminum’ through $\text{-}\mathcal{L}\mathcal{d}\mathcal{L}\mathcal{C}\mathcal{d}\mathcal{P}\mathcal{L}$ *-fexwoi* ‘iodine’. Copper-Cupalite part 2: $\text{-}\mathcal{L}\mathcal{d}\mathcal{L}\mathcal{L}$ *-fesi* ‘Novodneprite’ through $\text{-}\mathcal{L}\mathcal{d}\mathcal{L}\mathcal{P}$ *-fesa* ‘Hunchunite’. However, most families have fewer than 16, and the unused vocabulary items remain unassigned.

Within each SPECIES of $\mathcal{X}\mathcal{C}\mathcal{L}\mathcal{d}$ *Dw--*, each expansion-species starts over with F--- words beginning with $\mathcal{L}\mathcal{L}\mathcal{I}\mathcal{I}$ *Fuhu*. Since Plan 1 requires the first expansion vowel to echo the last HEADWORD vowel, and the final expansion vowel begins with 1 rather than 0, Plan 1 limits expansion items per HEADWORD to $16 \times 15 = 240$. Plan 2 was designed to raise the number of options. See the next section for details.

Notice that this series of minerals includes several which are simple elements in themselves. As such, they are also represented in the $\mathcal{V}\mathcal{L}\mathcal{I}\mathcal{I}$ *Ki--* GENUS which represents the periodic table of elements. In these cases, it may be helpful to use the element’s name following the mineral class’s name. For example: The element ‘Aluminum’ is $\mathcal{V}\mathcal{L}\mathcal{I}\mathcal{I}$ *kiha*; ‘native aluminum’ as a mineral is $\mathcal{X}\mathcal{C}\mathcal{L}\mathcal{d}\text{-}\mathcal{L}\mathcal{d}\mathcal{L}\mathcal{L}$ *dwxe-fexi*, but could also be called $\mathcal{X}\mathcal{C}\mathcal{L}\mathcal{d}\text{-}\mathcal{V}\mathcal{L}\mathcal{I}\mathcal{I}$ *dwxe-kiha* ‘mineral aluminum’; The element ‘Iodine’ is $\mathcal{V}\mathcal{L}\mathcal{L}\mathcal{d}$ *kifo*; ‘iodine’ as a mineral is $\mathcal{X}\mathcal{C}\mathcal{L}\mathcal{d}\text{-}\mathcal{L}\mathcal{d}\mathcal{L}\mathcal{C}\mathcal{d}\mathcal{P}\mathcal{L}$ *dwxe-fexwoi* or could be called $\mathcal{X}\mathcal{C}\mathcal{L}\mathcal{d}\text{-}\mathcal{V}\mathcal{L}\mathcal{L}\mathcal{d}$ *dwxe-kifo*, ‘mineral iodine’.

An example with instructions for creating the word-table in Plan 1 is shown in Dp 18.3.

Native Elements Series 1.A: Metals and Intermetallic Alloys							
Series Head word:							1
59410 E812	2	dwxe	du'je	dwxe	Metals and Intermetallic Alloys		2
First Expansion Word for this series:							3
Letter 2	e	2	256	512	Letter 3: assign in sequence within each species by hand		4
Letter 3	x	1	16	16			5
Letter 4	u	0	0	0			6
Word	fexu			12816			7

Dp 18.3: Example with instructions for Plan 1

(Expansion Plan 1 instructions: When a second series of expansions is needed, point to a second headword and repeat the process.)

Dp 18.4 shows a word-table for Native Elements Series 1.A.

In summary for SPECIES $\mathcal{X}_{\text{qL}} - \text{Dwx}$ - 'Nickel-Strunz Class 01: Native Elements': Five of the possible 16 NN words are utilized, the rest are undefined. The first word in the SPECIES, $\mathcal{X}_{\text{qL}} \text{ dwxu}$ defines the series as a whole, with 8 expansion words defining the 8 Subclasses within N-S Family 1. Four of the 8 N-S Subclasses were actually defined for the proof-of-concept exercises using Plan 1, containing 19 groups and a total of 153 mineral names. Use of Plan 1 was discontinued at that point, as it was determined that Plan 1, being limited to 240 expansion words, does not offer enough expansion words for a topic as large and complex as mineralogy. Plan 1 offers certain ease-of-use benefits by echoing the final vowel of its HEADWORD in the first syllable of the expansion word, so it may be preferred for topics with more limited vocabulary needs. Plan 2 was then devised and implemented for some of the remaining 9 N-S Families.

Dp 18.4: Expansion word-table example for Plan 1.

Decimal	Hex	4th	Roman	IPA	NN	Semantics	N-S Code	Formula
12817	3211	1	dwxe-fexi	du'ʃe-feʃi*	ᳵ᳴ᳵ᳴᳴᳴᳴	Aluminium [^]	1.AA.05	Al
12817	3211	2	dwxe-fexe	du'ʃe-feʃe	ᳵ᳴ᳵ᳴᳴᳴᳴	Copper	1.AA.05	Cu
12817	3211	3	dwxe-fexei	du'ʃe-feʃej	ᳵ᳴ᳵ᳴᳴᳴᳴᳴	Electrum	1.AA.05	(Au,Ag)
12817	3211	4	dwxe-fexa	du'ʃe-feʃa	ᳵ᳴ᳵ᳴᳴᳴᳴᳴	Gold	1.AA.05	Au
12817	3211	5	dwxe-fexai	du'ʃe-feʃaj	ᳵ᳴ᳵ᳴᳴᳴᳴᳴᳴	Lead	1.AA.05	Pb
12817	3211	6	dwxe-fexo	du'ʃe-feʃɔ	ᳵ᳴ᳵ᳴᳴᳴᳴᳴᳴	Nickel	1.AA.05	Ni
12817	3211	7	dwxe-fexoi	du'ʃe-feʃɔj	ᳵ᳴ᳵ᳴᳴᳴᳴᳴᳴᳴	Silver	1.AA.05	Ag
12817	3211	8	dwxe-fexw	du'ʃe-feʃu	ᳵ᳴ᳵ᳴᳴᳴᳴᳴᳴᳴	UM2004-08- E:AuCuPd	1.AA.05	Cu2PdAu
12817	3211	9	dwxe-fexwi	du'ʃe-feʃwi	ᳵ᳴ᳵ᳴᳴᳴᳴᳴᳴᳴᳴	UM1991-06- E:AuCu	1.AA.05	Au3Cu
12817	3211	10	dwxe-fexwe	du'ʃe-feʃwe	ᳵ᳴ᳵ᳴᳴᳴᳴᳴᳴᳴᳴᳴	Auricupride	1.AA.10a	Cu3Au
12817	3211	11	dwxe-fexwei	du'ʃe-feʃwej	ᳵ᳴ᳵ᳴᳴᳴᳴᳴᳴᳴᳴᳴᳴	Tetra- auricupride	1.AA.10b	AuCu
12817	3211	12	dwxe-fexwa	du'ʃe-feʃwa	ᳵ᳴ᳵ᳴᳴᳴᳴᳴᳴᳴᳴᳴᳴	Cuproauride	1.AA.10a	Cu3Au
12817	3211	13	dwxe-fexwai	du'ʃe-feʃwaj	ᳵ᳴ᳵ᳴᳴᳴᳴᳴᳴᳴᳴᳴᳴᳴	Anyuiite	1.AA.15	AuPb2
12817	3211	14	dwxe-fexwo	du'ʃe-feʃwɔ	ᳵ᳴ᳵ᳴᳴᳴᳴᳴᳴᳴᳴᳴᳴᳴᳴	Khatyrkite	1.AA.15	(Cu,Zn)A l2
12817	3211	15	dwxe-fexwoi	du'ʃe-feʃwɔj	ᳵ᳴ᳵ᳴᳴᳴᳴᳴᳴᳴᳴᳴᳴᳴᳴᳴	Iodine	1.AA.15	I2

* Generated from template and Table _ above

[^] Semantics, N-S code, Formula: copied from Mindat website, reformed, pasted in place.

18.3. Expansion Plan 2

Plan 2 removes the requirement of echoing the second vowel of the HEADWORD in the expansion word, thus increasing the space for possible expansion to 4096 words for each HEADWORD. With 16 potential HEADWORDS in each SPECIES, this provides expansion vocabulary space of up to 65,536 words for each SPECIES. If an entire GENUS of 256 words is dedicated to expansion headwords (as it is in ᳵ᳴-- Dw-- except for ᳵ᳴᳴- Dwh-), vocabulary space provided in Plan 2 is as many as 16,777,216 four-syllable words for each GENUS. Though it seems unlikely that this much vocabulary would actually need to be created, the large available space allows flexibility for choosing patterns of words that coordinate logically with the pattern of concepts being represented.

Here is how Plan 2 works.

18.3.1. Plan 2 System

We use this notation for clarity:

HEADWORD C1V1 C2V2-
F--- word C3V3 C4V4

C3 is always F in EXPANSION words.

“EXPANSION GENUS” is a series beginning F V3 --. There are 16 possible V3s, thus 16 EXPANSION GENI in the F--- family.

A “CONCEPT” is a set of terms logically grouped together within the topic being represented; for example, “Tectocilicates”.

1. In each EXPANSION GENUS, V3 begins with τu (0); this is incremented to the next vowel in order when the value of C4 passes 15 χb and is re-set to 0.
2. In each EXPANSION GENUS, C4 begins with τh (0). It is incremented either when:
 - a. a new EXPANSION SPECIES is started to represent a new CONCEPT; or
 - b. V4 reaches a value of χb 16.
3. V4 is set to τu (0)
 - a. when starting with a new HEADWORD; or
 - b. when beginning a new CONCEPT, which initiates a new EXPANSION SPECIES. The word ending with τu represents the CONCEPT.
4. Series of words within the same CONCEPT begin with V4 set to $\perp i$ (1). V4 is incremented for each new word. When V4 reaches 16 $\wp woi$, C4 is incremented and V4 is re-set to $\perp i$ (1). V4 is only set to τu (0) when a new CONCEPT or HEADWORD is started.

Plan 2 is illustrated with N-S CONCEPT Tectosilicates. It is a Subclass of Silicates and consists of 9 groups ($D\rho$ 18.5):

ᐃᑭ 18.5: Plan 2 Example: Nickel-Strunz class 09, list of Sub-Series

Nickel-Strunz class 09: Silicates and Germanates, Part 1 Series 9.F-G:					
Tectosilicates					
dwco	du'tjɔ	ᐅᐅᐅᐅ	Tectosilicates	9.F-G	9
Roman	IPA	NN	Semantics	Code	Word Count
dwco-fuhu	du'tjɔ-fə,hə	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Tektosilicates without additional non-tetrahedral anions	9.FA	39
dwco-fufu	du'tjɔ-fə,fə	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Tektosilicates with additional anions	9.FB	39
dwco-funu	du'tjɔ-fə,nə	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Zeolites with T ₅ O ₁₀ Units – The Fibrous Zeolites	9.GA	9
dwco-fumu	du'tjɔ-fə,mə	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Chains of single connected 4-membered rings	9.GB	14
dwco-fuku	du'tjɔ-fə,kə	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Chains of doubly-connected 4-membered rings	9.GC	16
dwco-futu	du'tjɔ-fə,tə	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Chains of 6-membered rings – tabular zeolites	9.GD	29
dwco-fugu	du'tjɔ-fə,gə	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Chains of T ₁₀ O ₂₀ Tetrahedra	9.GE	14
dwco-fuju	du'tjɔ-fə,dʒə	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Other Rare Zeolites	9.GF	10
dwco-fudu	du'tjɔ-fə,də	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Unclassified zeolites	9.GG	2

There are 172 minerals in the Tectosilicate Subclass. Shown in ᐃᑭ 18.6 is the first Group in the Subclass, the “Tektosilicates without additional non-tetrahedral anions”, containing 39 minerals:

ᐃᑭ 18.6: Plan 2 Example: Nickel-Strunz Class 09 Sub-Series 9.FA

Nickel-Strunz Class 09: Silicates and Germanates, Part 1 Series 9.F-G:					
Tectosilicates, Sub-Series 9.FA, Tektosilicates without additional non-tetrahedral anions					
dwco-fuhu	du'tjɔ-fə,hə	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Tektosilicates without additional non-tetrahedral anions	9.FA	39
Roman	IPA	NN	Semantics	Code	Formula
dwco-fuhi	du'tjɔ-fə,hi	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Kaliophilite	9.FA.05	KAISiO4
dwco-fuhe	du'tjɔ-fə,he	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Kalsilite	9.FA.05	KAISiO4
dwco-fuhei	du'tjɔ-fə,hej	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Nepheline	9.FA.05	Na3K(Al4Si4O16)
dwco-fuha	du'tjɔ-fə,ha	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Panunzite	9.FA.05	(K,Na)AlSiO4
dwco-fuhai	du'tjɔ-fə,haj	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Trikalsilite	9.FA.05	K2NaAl3(SiO4)3
dwco-fuho	du'tjɔ-fə,hə	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Yoshiokaite	9.FA.05	(Ca,Na)[Al(Al,Si)O4]
dwco-fuhoi	du'tjɔ-fə,həj	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Megakalsilite	9.FA.05	KAISiO4
dwco-fuhw	du'tjɔ-fə,hu	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Malinkoite	9.FA.10	NaBSiO4
dwco-fuhwi	du'tjɔ-fə,hwi	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Virgilite	9.FA.15	LiAlSi2O6
dwco-fuhwe	du'tjɔ-fə,hwe	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Lisitsynite	9.FA.25	KBSi2O6
dwco-fuhwei	du'tjɔ-fə,hwej	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Adularia	9.FA.30	KAISi3O8
dwco-fuhwa	du'tjɔ-fə,hwa	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Anorthoclase	9.FA.30	(Na,K)AlSi3O8
dwco-fuhwai	du'tjɔ-fə,hwaj	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Buddingtonite	9.FA.30	(NH4)(AlSi3O8)
dwco-fuhwo	du'tjɔ-fə,hwə	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Celsian	9.FA.30	Ba(Al2Si2O8)
dwco-fuhwoi	du'tjɔ-fə,hwəj	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Hyalophane	9.FA.30	(K,Ba)[Al(Si,Al)Si2O8]
dwco-fuxi	du'tjɔ-fə,ʃi	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Microcline	9.FA.30	K(AlSi3O8)
dwco-fuxe	du'tjɔ-fə,ʃe	ᐅᐅᐅᐅ-ᐅᐅᐅᐅ	Orthoclase	9.FA.30	K(AlSi3O8)

because new CONCEPTS require C4 to be incremented from the last word in the previous concept: λs (2) +1 = λf (3). The first mineral in this new group is 'Afghanite', assigned V4 \cup i (1) as discussed above: ጽጻሂታ-ጸጸሊሊ *dwco-fufi*.

As mentioned, a spreadsheet template is provided for creating expansion vocabulary. The NN words are generated in the format shown above. Vocabulary from online expert sources generally needs some format manipulation, but can then be pasted into the template with relatively little difficulty.

This concludes the discussion of Nwehu Nuswei expansion words.



Dp 18.7: ጽጻሂታ-ጸጸሊሊ dwco-fuxi 'Microcline', listed and mentioned in the discussion above.

*Credit: Rob Lavinsky, iRocks.com
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