

## E Ho'oholo I Ke Ana Wela O Ka Pele

### *'Ōwehe Laulā:*

'A'ole ma'alahi e kau ka mea ana wela i loko o ka pele wela. Hiki ke ho'ohana 'ia nā mauha'a thermocouples a me ka radiometric. Ma ia ki'ina 'ohi hāpana, e lawe i kekahi hāpana o ka pele wela, a laila ho'okomo i ka wai 'olu. A laila, e lawe 'ia ka hāpana i ke ke'ena ho'okolohua a e kālailai no ka magnesium oxide (MgO). 'O kēia ka ha'ilula no ka ho'oholo 'ana o ke ana wela (Centrigrade) =  $(23 \times \text{MgO}) + 1012$ . Inā nui ka magnesium oxide, wela loa ka pele.

### *Nā Pahuhopu:*

E a'o ana ka haumana:

- e ho'omaulia i ke ana wela o ka pele me ka MgO;
- e hana i kekahi pakuhi e ho'olikelike i ka MgO a me ke ana wela;
- e ho'ohana i ka 'ikepili mai ka lua'i pele o Mauna Loa i ka makahiki 1984; a me
- e maopopo i ka pilina ma waena o ke ana wela a me ka MgO.

### *Nā Pono Ha'awina:*

- Nā mīkini helu
- Ka Pepa Ha'awina Haumana: "E Ho'oholo I Ke Ana Wela O Ka Pele"

### *Ke Ka'ina Hana Ha'awina:*

1. E noi i nā haumāna pehea e ho'oholo ai nā kānaka 'epekema i ke ana wela o ka pele.
2. E wehewehe, loa'a kekahi mau ki'ina hana no ke ana wela o ka pele e like me ka thermocouples uila kekahi mauha'a i ho'okomo i ka pele. Loa'a nā mauha'a radiometric (ua like kēia me kekahi pahu pa'i wikiō) 'o ia kekahi mauha'a e palapala i ke ana wela o ka 'ili o ka pele. 'Ano pa'akikī ka ho'ohana 'ana o ka mauha'a radiometric no ka mea heluhelu ia ka wahi ma'alili puni o ka pele. 'O ke kālailai kemikala (chemical) kekahi ki'ina 'ē a'e no ka ho'oholo 'ana o ke ana wela o ka pele. Aia ka magnesium oxide i loko o ka pele. Hiki i nā kānaka 'epekema ke ho'oholo i ke ana wela o ka pele ma mua pono o ka ma'alili 'ana ma muli o ka pākēneka magnesium oxide (MgO) i loko o ka pele.
3. E kākā'ahi i nā mīkini helu a me ka Pepa Ha'awina Haumana: "E Ho'oholo I Ke Ana Wela O Ka Pele." E heluhelu a kūkākūkā i Ka Nīnau Ho'ā'o. E noi i nā haumāna e kākāu i ke kuhiakau a laila e ho'omaulia i ka 'ikepili no ka Pakuhi (Table)#1.
4. E hō'ike i nā haumāna pehea e kākāu ai i ka 'ikepili ma ka Pakuhi (Graph) #1. E noi i nā haumāna e ho'okō i ka pakuhi.
5. E wehewehe no nā nīnau 3 a me 4 i ka māhele Ka 'Ikepili Kālailai, e ho'omaulia i ke ana wela o nā hāpana pele maoli, a laila e kākāu a lepili i kēia mau hāpana ma ka pakuhi. E hō'ike, a laila e noi i nā haumāna e ho'okō i ka pepa ha'awina haumana.
6. E kūkākūkā i nā hopena o nā haumāna.

### *Aia nā pane ma ka 'ao'ao a'e*

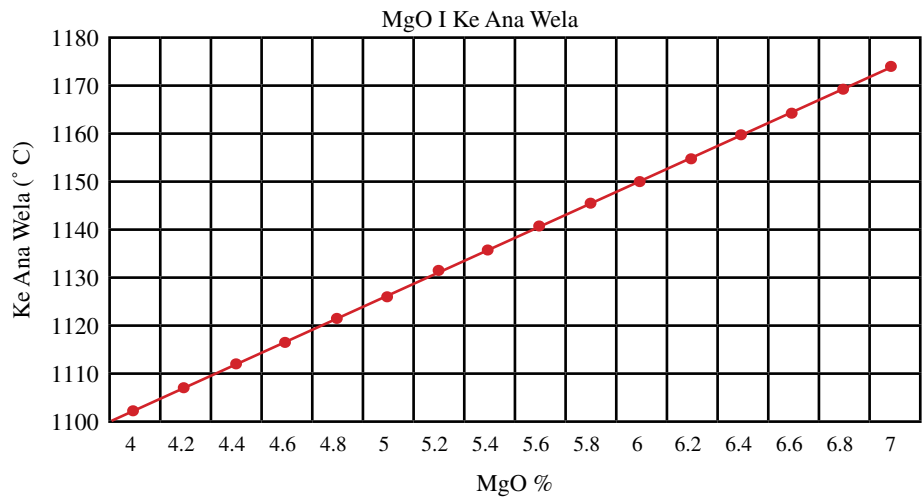
## E Ho'oholo I Ke Ana Wela O Ka Pele

### Nā Pane I Ka Pepa Ha'awina Haumana:

**Ka Pakuhi 'Ikepili 1:**

MgO%	Ke Ana Wela (° C)
4	1104
4.2	1108.6
4.4	1113.2
4.6	1117.8
4.8	1122.4
5	<b>1127</b>
5.2	1131.6
5.4	1136.2
5.6	<b>1140.8</b>
5.8	1145.4
6	<b>1150</b>
6.2	1154.6
6.4	<b>1159.2</b>
6.6	<b>1163.8</b>
6.8	1168.4
7	1173

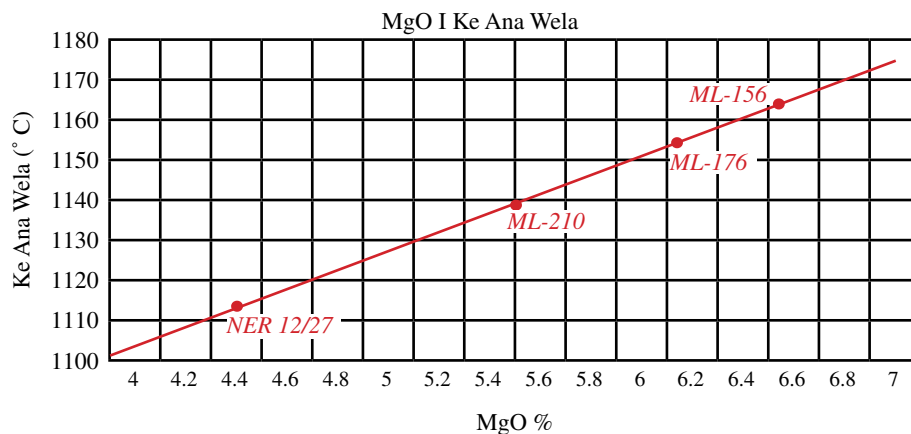
**Ka 'Ikepili Kālailai #1:**



**Ka 'Ikepili Kālailai #2:**

Ka Hāpana	Ka Lā	Ka Mamao (km)	MgO %	Ke Ana Wela (° C)
ML-156	3/25/84	0.0	6.57	<b>1163.11</b>
ML-176	3/25/84	8.76	6.17	<b>1153.91</b>
NER-12/27	3/30/84	14	4.42	<b>1113.66</b>
ML-210	4/15/84	21.63	5.48	<b>1138.04</b>

**Ka 'Ikepili Kālailai #3:**



**Ka 'Ikepili Kālailai #4:**

Ka MgO i loko  
 4.1% = ~1106° C  
 5.9% = ~1148° C

**Ka Hopena:**

E 'oko'a ana nā pane akā pono kēia: ke pi'i ka MgO i loko, pi'i pū ke ana wela; ke emi ka MgO i loko, emi pū ke ana wela.

## E Ho'oholo I Ke Ana Wela O Ka Pele

***Ka Nīnau Ho'ā'o:***

Pehea ka pili o ke ana wela o ka pele i ka nui o Magnesium Oxide (MgO) i loko o ka pele?

***Ka 'Ike Hou A'e:***

'A'ole ma'alahi e kau ka mea ana wela i loko o ka pele wela. Hiki ke ho'ohana 'ia nā mauha'a thermocouples a me ka radiometric. Ma ia ki'ina 'ohi hāpana, e lawe i kekahi hāpana o ka pele wela, a laila ho'okomo i ka wai 'olu. A laila, e lawe 'ia ka hāpana i ke ke'ena ho'okolohua a e kālailai no ka magnesium oxide (MgO). Ho'ohana nā kānaka 'epekeka i kekahi ha'ilula makemakika e ho'oholo i ke ana wela o ka pele ma mua pono o ka ma'alili 'ana ma muli o ka pākēneka magnesium oxide (MgO) i loko o ka pele. Ma kēia ha'awina, e ho'oholo ana 'oe i kekahi mau hāpana i lawe 'ia mai ka lua'i pele o Mauna Loa i ka makahiki 1984.

***Ke Kuhiakau:***

Pehea ke ana wela o ka pele e pili ai i ka nui o Magnesium Oxide (MgO) i loko o ka pele? E kākau i kāu kuhia kau ma ke 'ano he 'ōlelo inā-alaila ma nā laina ma lalo nei.

Inā \_\_\_\_\_,  
a laila \_\_\_\_\_.

***Ka 'Ikepili:***

1. Pakuhi #1, e ho'olikelike ka pākēneka o ka MgO (magnesium oxide) i ke ana wela o ka pele ma lalo nei. 'A'ohe kekahi o nā ana wela. E ho'ohana i ka ha'ilula ma lalo nei e ho'opiha i nā wahi hakahaka.

**$(23 \times \text{MgO}\%) + 1012 = \text{Ke Ana Wela } (^{\circ}\text{C})$**

**La'ana: No ka huli 'ana i ke ana wela o kekahi hāpana i loa'a ka MgO me 5%:**

$T = (23 \times 5) + 1012$

$T = 115 + 1012$

$T = 1127^{\circ}\text{C}$

Pakuhi #1:

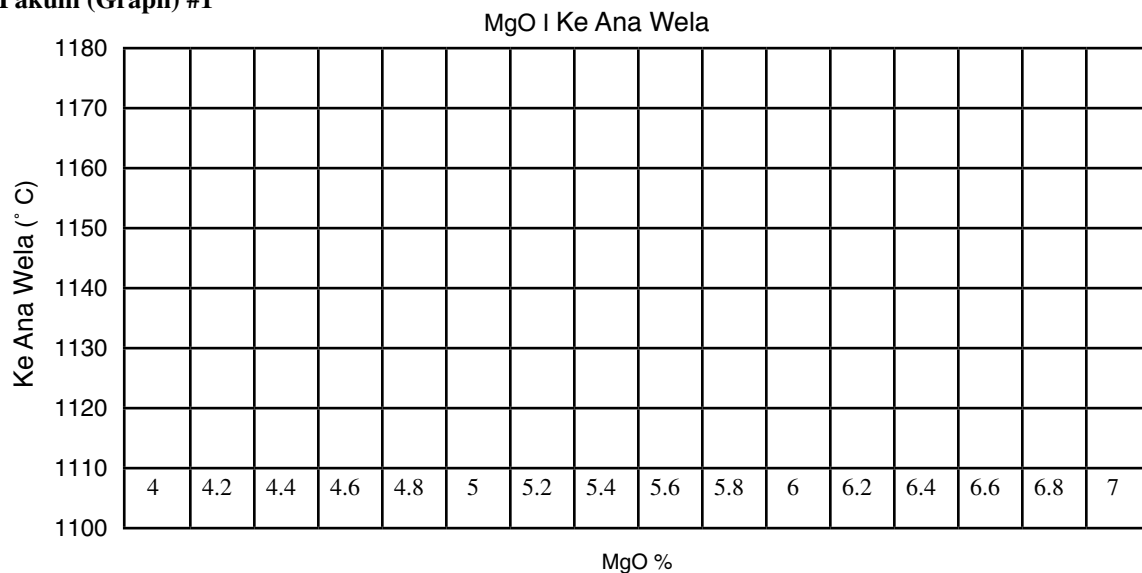
MgO%	Wela ( $^{\circ}\text{C}$ )
4	1104
4.2	1108.6
4.4	1113.2
4.6	1117.8
4.8	1122.4
5	
5.2	1131.6
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6.4	
6.6	
6.8	1168.4
7	1173

## E Ho'oholo I Ke Ana Wela O Ka Pele

**Ke Kālailai 'Ikepili:**

1. E ho'ohana i ka 'ikepili mai ka Pakuhi #1, e ho'opiha i ka pakuhi ma lalo nei i mea e ho'olikelike ai ka pākēneka o ka MgO a me ke ana wela.

**Pakuhi (Graph) #1**



2. He mau 'ikepili ma lalo nei mai ka lua'i pele o Mauna Loa i ka makahiki 1984. I ka pakuhi ma lalo nei aia ka hāpana, ka lā, ka mamao mai ka puka ea lua pele i lawe 'ia, a me ka pākēneka o ka MgO. E ho'omaulia i nā hāpana pākahi o ke ana wela o ka pele i ka manawa i lawe 'ia. E ho'ohana i ka ha'ilula: Ke ana wela (°C) = 23 x MgO(%) + 1012.

**Pakuhi (Table) #2:**

Ka Hāpana	Ka Lā	Ka Mamao (km)	MgO %	Ke AnaWela (° C)
ML-156	3/25/84	0.0	6.57	
ML-176	3/25/84	8.76	6.17	
NER-12/27	3/30/84	14	4.42	
ML-210	4/15/84	21.63	5.48	

3. Ke ho'opiha 'oe i ka pakuhi ma luna nei me nā ana wela no nā hāpana pākahi, e kākahi i nā hāpana ma ka Pakuhi (Graph) #1. Mai poina e kākahi i nā kiko me ka helu hāpana.
4. E ho'ohana i ka pakuhi, e koho i ke ana wela o ka pele inā 'o kēia ka MgO o loko:  
 4.1.% \_\_\_\_\_                      5.9% \_\_\_\_\_

Inoa: \_\_\_\_\_ **Pepa Ha'awina Haumana**

**E Ho'oholo I Ke Ana Wela O Ka Pele**

***Ka Hopena:***

E kākau i kou hopena ma ke 'ano he hōpuna 'ōlelo ma nā laina ma lalo nei.

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Ua hō'ōia a hō'ōia 'ole 'ia kou kuhiakau? E wehewehe i kou pane.

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