

$$BD_{\mathbb{W}bqb} \ c_{\mathbb{W}i_{\mathbb{W}P_{\mathbb{W}Z}}} :$$

bvg t 06bs wkgyevox BDwbqb cwi l` |

$$\dagger f \check{S} \# M_{vw} j K A e^{-} v b t$$

b x j d v g v i x ‡ R j v a x b R j X v K v D c ‡ R j v i 11 u B D ‖ b q ‡ b i g ‡ a ′ ‖ k g y e v o x B D ‖ b q b G K ‖ U ‖ b x j d v g v i x m ` i
 ‡ ‡ K 23 ‖ K ‡ j v i g U v i D E ‡ i G i A e ′ v b ‖ c ‡ e A ′ D c ‡ R j v i g x i M Ä B D ‖ b q b , ` ‖ y b I c ‖ ð g b x j d v g v i x m ` i
 D c ‡ R j v i i v g M Ä I U z v g v i x B D ‖ c A e ′ ′ Z ; D E ‡ i R j X v K v D c ‡ R j v i a g c v j B D ‖ b q b ; f - c K ‖ Z M Z K v i ‡ b G
 B D ‖ b q ‡ b i A ‖ a K v s k g v b y K ‖ l i D c i ‖ b f i k x j ‖ B D ‖ b q b ‖ U b ` x t e i ó Z G j v K v ‖ e l v ‡ g s m ‡ g b ` x Z v i R x e b ‖ d h i ‡ i
 c v q G K ‡ ‡ ‡ K I K ‡ ‡ a y c v i b A v i c v i b ‖ e l v i c v i b G A A ‡ ‡ j i g v b y ‡ i R x e b ‡ K K ‡ i Z z j ` ‖ e m n ‖ e l v ‡ g s m ‡ g
 c e v i n Z c ‖ j g v ‖ U G A A ‡ ‡ j i R i g ‡ K K ‡ i D e i ‖ m e y R k ′ v g ‡ j ‡ N i v A v g ‡ ′ i G B D ‖ b q b ‖
 R x i e K v t

G AÂ†j*i* AwaKvsk gbyB KwIRxie| ZvB Zviv me`vB `wi` mxgvi wb†P emevm K†i| ZvQvov PvKixRxie,
e`emvqx, †R†j, Kvgi, KvVig`x, ivRw`x, w`bgRy, cf,Z tckvi gby i†q†Q| A†b†K Avevi RxieKv wbev†ni
ZwM†` ivRavbx kni XvKvmn, Kzjv, PEmvg GgbwK we†`†ki KgiZ| Zviv iayG AÂ†j*i* A`%bwZK DbqbB bq
eis †`†ki mvgwMK Dbq†b h†_ô fvgKv ivL†Q|

~~BDwbqb feb -wvcZ t bzfb feb -wvcZ-2007wLt~~

$\dagger jvKmsL^{\ddot{v}}t$

#gwU RbmsL"v t 36,305 Rb, Gi g#a" bviX 18,195 Rb Ges cyjY 18,110|

cwZ eM wK†jwgUv†i 564 Rb K†i †jvK evm K†i |

l qvW msL"v t 09wU

cwiei msL"v t 4573wU

g^hRv msL^v t 09U (eikun; ɯkgyevox; nv⁺oq ɯkgyevox; Avⁱ ɯR ɯkgyevox; iVRevox; Nɯgix; j^ygvoB; D*ē*i
te^{iæ}`; `y^bte^{iæ}`)

Mv#gi msL'v t 09U (evkùn; ‖kgýevox; nvtoq ‖kgýevox; AvivR ‖kgýevox; ivRevox; Nngvix; jýxgrovB; DĖi teiæ>`; `ýb teiæ>`)

$L_V \sim k_B T_i P_{\text{WH}} \sim (e_{\text{WH}}/K) \approx 23,000 \text{ kg U}$

AvqZb t 2509 †n±i (Avevll` Rllg-2038 †n±i Abvevll` Rllg-471 †n±i)

$\overline{iv} \text{ } \overline{v} \text{ } t \text{ } 89 \text{ } \ll Kt \text{ } \ll gt \text{ } (cu \text{ } \overline{iv} \text{ } \overline{v} \text{ } 35 \text{ } \ll K \ddagger j \text{ } \ll gUvi \text{ } | \text{ } Kv \text{ } \overline{iv} \text{ } \overline{v} \text{ } 54 \text{ } \ll K \ddagger j \text{ } \ll gUvi \text{ } |$

Wk 11 v1 t 63%

we fb cllZôvb t Mvj m $\bar{x}$ -1uU; D"p gva"wgK we`"vj q -2uU; `vllj gv`vmv-02uU;

miKviX cV_wgK we`ˊvjq- 21wU; wba gvaˊwgK we`ˊvjq -2wU; KʃjR-01wU;

$\overline{v}^{\prime\prime} \# K \rangle \quad t \parallel kgyeox \quad BD \parallel bq \# b \quad 01 \parallel U \quad \overline{v}^{\prime\prime} \parallel tmev \parallel K \rangle \quad \parallel e^{\prime\prime} \parallel gvb \parallel K \parallel gD \parallel b \parallel U \parallel K \parallel b \parallel K - 03$

$gmR\#`i\ msL`v\ t\ 38\ u;$ $Avkq\#K>\`t\ 02\ u;$        $bjK\#ci\ msL`vt\ 5680\ u;$

Wkgj^{vo}x BD**w**bq**†**bi we**w**fb m**y**ea**v** †f**v**M**x**i msL^v t

|| fWeD||e t 309 Rb |

$\|f\|_{RGd} \approx 3775 \|Rb\|$

eq⁻ f_vZ_v t 657 Rb

$${}_{54}^{231}\text{Pa} \xrightarrow{\alpha} {}_{90}^{227}\text{Th} \xrightarrow{\alpha} {}_{82}^{213}\text{Pb} \xrightarrow{\beta^-} {}_{82}^{213}\text{Bi} \xrightarrow{\alpha} {}_{82}^{209}\text{Pb} \xrightarrow{\beta^-} {}_{82}^{209}\text{Bi}$$

g_vZZK_{vw}jb f_vZ_v t 108 Rb

$c^{1/2} y f_V Z_V t \ 215 \ Rb |$

gy³#hv×v fvZv t 02 Rb|

$$b \times t$$

Ⓜkgyevox BDⓂbqʃb nVU -evRvʃii mSʌv t Ⓜkgyevox BDⓂbqʃb 03ⓂU nVU -evRvʃi iʃqʃ0

cWZ mBv#n `y`b K#i G nVU ,#jv e#m|

(1. $\text{qve}^{\text{ox}} \text{nvU/} \text{e}^{\text{Rvi}}$; 2. $\text{ev}^{\text{vickz}} \text{nvU/} \text{e}^{\text{Rvi}}$; 3. $\text{y}^{\text{b}} \text{te}^{\text{ie}} \text{nvU/} \text{e}^{\text{Rvi}}$;

(2. †Lʷqvi BRʷiv t †kgyeʷox BD†bq†bi †Lʷqvi 03†U i†q†Q BRʷiv †`qv nq†b)

$f_{\text{tg}} A_{\text{ldm}} t_{\text{kg}} y_{\text{evox}} BD_{\text{lbq}} b_{\text{b}} (w_{\text{qvevox}} e_{\text{ivR}} \# i_{\text{Ae}} \bar{Z}) f_{\text{tg}} A_{\text{ldm}} A_{\text{v}} \# Q | h_{\text{v}} v_{\text{c}} y_{\text{v}} Z_{\text{b}} R_{\text{iv}} R_{\text{xb}} f_{\text{e}} \# b_{\text{KvR}} K_{\text{g}} P_{\text{j}} \# Q |$