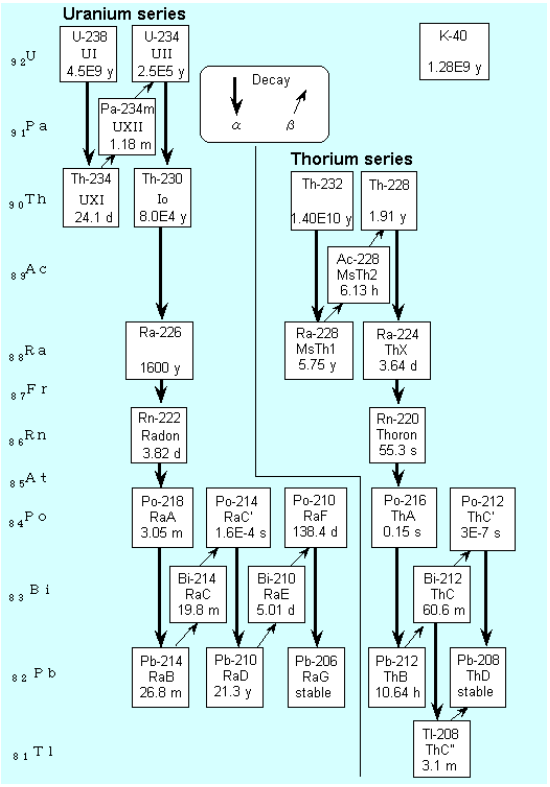
崩壊系列 Decay series



核データ　Nuclear data

Prominent Nuclides in the Environment

Parent Nuclide	Gamma Energy (keV)	Source	Gammas emitted per parent disintegration
^{238}U	186	^{228}Ra	0.034
	242	^{214}Pb	0.070
	295	^{214}Pb	0.179
	352	^{214}Pb	0.350
	609	^{214}Bi	0.430
	768	^{214}Bi	0.048
	1120	^{214}Bi	0.145
	1765	^{214}Bi	0.147
	2205	^{214}Bi	0.047
^{232}Th	240	^{212}Pb+^{224}Ra	0.490
	338	^{228}Ac	0.129
	463	^{228}Ac	0.047
	727	^{228}Ac	0.079
	911	^{228}Ac	0.290
	966	^{228}Ac	0.230
	1588	^{228}Ac	0.046
	510	^{208}Tl	0.096
	583	^{208}Tl	0.300
	860	^{208}Tl	0.047
	2615	^{208}Tl	0.360
^{40}K	1461		0.107

比放射能　Specific radioactivity

Specific Radioactivity

Radioelement	γ-emitter(s)	No. of emission lines	Total photon yield(%)	Specific activity (Bq/g-Radioelement)
Thorium	^{232}Th+daughters	94	423.6	4100
Uranium	^{238}U +daughters	75	263.6	12227
Potassium	^{40}K	1	10.7	30.8

Kirkegaard, P. and Lφvborg, L.(1974) "Computer modeling of terrestrial gamma-radiation fields", Risφ Report No.303 (Danish Atomic Energy Commission, Copenhagen).

換算係数　Conversion factors

放射能および線量率の相互換算

ppm,% → pCi/g	pCi/g → ppm,%
U (ppm) × 0.330 = (pCi/g)	U (pCi/g) × 3.03 = (ppm)
Th(ppm) × 0.111 = (pCi/g)	Th (pCi/g) × 9.01 = (ppm)
K (%) × 8.32 = (pCi/g)	K (pCi/g) × 0.120 = (%)
ppm,% → Bq/kg	**Bq/kg → ppm,%**
U (ppm) × 12.2 = (Bq/kg)	U (Bq/kg) × 0.0820 = (ppm)
Th(ppm) × 4.1 = (Bq/kg)	Th (Bq/kg) × 0.24 = (ppm)
K (%) × 308 = (Bq/kg)	K (Bq/kg) × 0.00325 = (%)
1 (pCi)=0.0370 (Bq)	1 (Bq)=27.0 (pCi)

一様体積線源

ppm,% → μR/h at 1 m	μR/h at 1 m →ppm,%
U (ppm) × 0.62 = (μR/h)	U (μR/h) × 1.6 = (ppm)
Th(ppm) × 0.31 = (μR/h)	Th (μR/h) × 3.2 = (ppm)
K (%) × 1.49 = (μR/h)	K (μR/h) × 0.671 = (%)
ppm,% → nGy/h at 1 m	**nGy/h at 1 m → ppm,%**
U (ppm) × 5.4 = (nGy/h)	U (nGy/h) × 0.19 = (ppm)
Th(ppm) × 2.7 = (nGy/h)	Th(nGy/h) × 0.37 = (ppm)
K (%) × 13.0 = (nGy/h)	K (nGy/h) × 0.0769 = (%)
Bq/kg → nGy/h at 1 m	**nGy/h at 1 m → Bq/kg**
U (Bq/kg) × 0.44 = (nGy/h)	U (nGy/h) × 2.3 = (Bq/kg)
Th(Bq/kg) × 0.65 = (nGy/h)	Th(nGy/h) × 1.5 = (Bq/kg)
K (Bq/kg) × 0.042 = (nGy/h)	K (nGy/h) × 24 = (Bq/kg)

相互換算

	J	μR/h	nGy/h
J	1	1.73	15.1
μR/h	0.578	1	8.73
nGy/h	0.0662	0.115	1

1 rad = 0.01 Gy

J：イオン対生成率
μR/h：照射線量率
nGy/h：空気吸収線量率