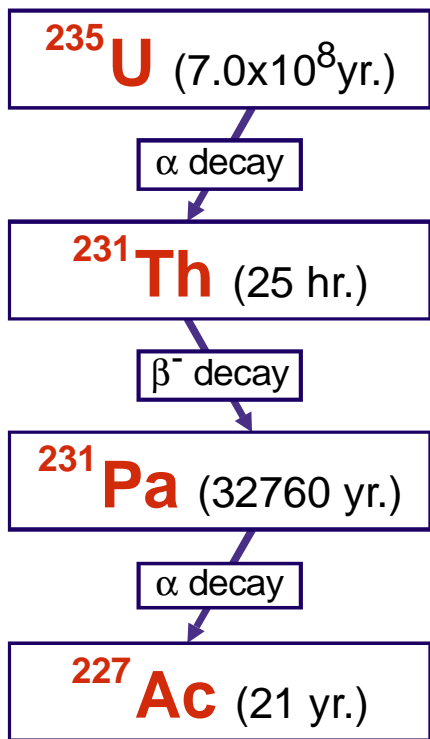
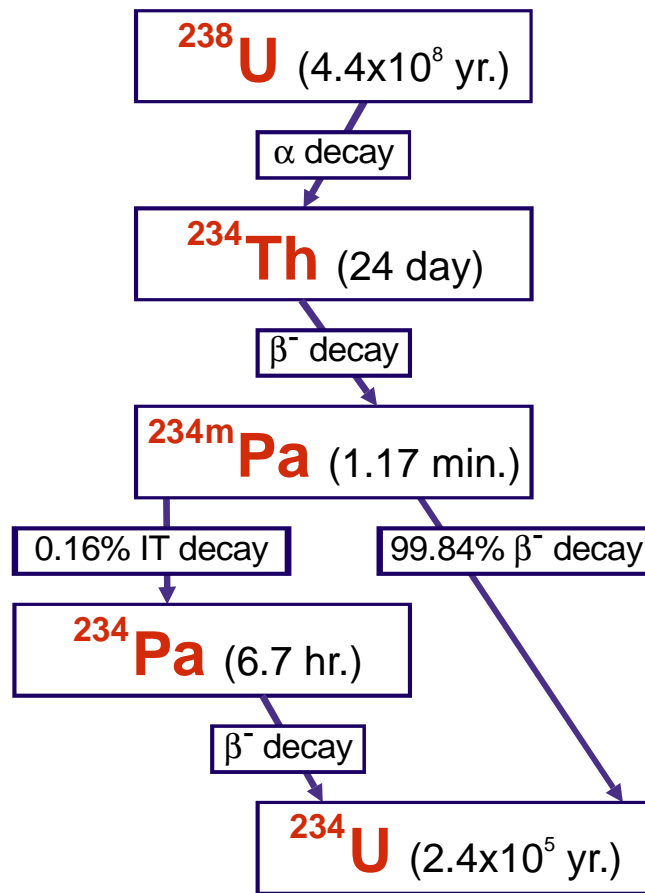


²³⁵U Decay Chain



See ²²⁷Ac for Chain completion

²³⁸U Decay Chain



See ²³⁴U for Chain completion



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: **Uranium Ore ($^{238}\text{U} + ^{235}\text{U}$ with daughters)**Half Life: $4.468(3) \times 10^9$ yr. + $7.038(5) \times 10^6$ yr. E_γ , σE_γ - 1998 ENSDF Data For I_γ , σI_γ - 1998 ENSDF Data, See: ^{226}Ra , ^{235}U , and ^{238}U SpectraDetector: 65 cm³ coaxial Ge (Li)

Method of Production: Natural Radioactivity

| Isotope | E_γ (keV) | σE_γ | S |
|---------------------------|------------------|-------------------|---|
| ^{234}Th | 63.29 | 0.02 | 4 |
| ^{231}Pa | 63.65 | 0.02 | 4 |
| ^{231}Pa | 74.15 | 0.04 | 4 |
| ^{231}Pa | 77.34 | 0.03 | 3 |
| ^{231}Th | 84.214 | 0.003 | 4 |
| ^{234}Th | 92.38 | 0.01 | 3 |
| ^{234}Th | 92.80 | 0.02 | 3 |
| ^{235}U | 143.76 | 0.02 | 4 |
| ^{223}Ra | 144.23 | 0.01 | 4 |
| ^{223}Ra | 154.21 | 0.01 | 4 |
| ^{235}U | 163.33 | 0.02 | 4 |
| ^{235}U | 185.715 | 0.005 | 2 |
| ^{226}Ra | 186.211 | 0.013 | 4 |
| | 195.70 | 0.20 | 4 |
| ^{235}U | 205.311 | 0.010 | 4 |
| ^{223}Fr | 234.80 | 0.01 | 4 |
| $^{234\text{m}}\text{Pa}$ | 235.85 | 0.18 | 4 |
| ^{227}Th | 235.971 | 0.020 | 4 |
| ^{224}Ra | 240.986 | 0.006 | 2 |
| ^{214}Pb | 241.977 | 0.003 | 2 |
| ^{231}Pa | 255.77 | 0.05 | 4 |
| ^{227}Th | 256.25 | 0.02 | 4 |
| ^{214}Pb | 258.87 | 0.20 | 4 |
| ^{228}Ac | 269.28 | 0.04 | 4 |
| ^{223}Ra | 269.459 | 0.010 | 4 |
| ^{219}Rn | 271.23 | 0.01 | 4 |
| ^{231}Pa | 273.14 | 0.06 | 4 |
| ^{214}Bi | 273.80 | 0.5 | 4 |
| ^{214}Pb | 274.80 | 0.05 | 4 |
| ^{231}Pa | 283.69 | 0.01 | 4 |
| ^{227}Th | 286.122 | 0.020 | 4 |
| ^{214}Pb | 295.224 | 0.002 | 1 |
| ^{227}Th | 300.00 | 0.03 | 4 |
| ^{231}Pa | 302.65 | 0.01 | 4 |
| ^{227}Th | 314.78 | 0.09 | 4 |
| ^{223}Ra | 323.87 | 0.01 | 4 |
| ^{227}Th | 329.851 | 0.02 | 4 |
| ^{231}Pa | 330.06 | 0.01 | 4 |

| Isotope | E_γ (keV) | σE_γ | S |
|-------------------|------------------|-------------------|---|
| ^{227}Th | 334.38 | 0.02 | 4 |
| ^{223}Ra | 338.281 | 0.010 | 4 |
| ^{228}Ac | 338.32 | 0.06 | 4 |
| ^{227}Th | 342.50 | 0.09 | 4 |
| ^{211}Bi | 351.06 | 0.04 | 1 |
| ^{214}Bi | 351.9 | 0.5 | 1 |
| ^{214}Pb | 351.932 | 0.002 | 1 |
| ^{214}Bi | 386.77 | 0.05 | 4 |
| ^{214}Bi | 388.88 | 0.05 | 4 |
| ^{219}Rn | 401.81 | 0.01 | 4 |
| ^{211}Pb | 404.853 | 0.010 | 4 |
| ^{214}Bi | 405.74 | 0.3 | 4 |
| ^{211}Pb | 427.088 | 0.010 | 4 |
| ^{223}Ra | 445.03 | 0.01 | 4 |
| ^{214}Bi | 454.77 | 0.12 | 4 |
| ^{214}Bi | 461.00 | 0.2 | 4 |
| ^{214}Bi | 469.76 | 0.07 | 4 |
| ^{214}Bi | 474.41 | 0.05 | 4 |
| ^{214}Pb | 480.43 | 0.08 | 4 |
| ^{214}Pb | 533.66 | 0.02 | 4 |
| ^{214}Bi | 543.0 | 0.2 | 4 |
| ^{214}Bi | 572.76 | 0.07 | 4 |
| ^{214}Pb | 580.13 | 0.03 | 4 |
| ^{214}Bi | 609.312 | 0.007 | 1 |
| ^{214}Bi | 615.73 | 0.10 | 4 |
| ^{214}Bi | 633.14 | 0.10 | 4 |
| ^{214}Bi | 639.67 | 0.10 | 4 |
| ^{214}Bi | 649.18 | 0.07 | 4 |
| ^{214}Bi | 665.453 | 0.022 | 3 |
| ^{214}Bi | 683.22 | 0.06 | 4 |
| ^{214}Bi | 697.90 | 0.25 | 4 |
| ^{214}Bi | 703.11 | 0.04 | 4 |
| ^{211}Pb | 704.64 | 0.03 | 4 |
| ^{214}Bi | 710.67 | 0.10 | 4 |
| ^{214}Bi | 719.86 | 0.03 | 4 |
| ^{214}Bi | 733.80 | 0.15 | 4 |

| Isotope | E_γ (keV) | σE_γ | S |
|---------------------------|------------------|-------------------|---|
| ^{214}Bi | 752.84 | 0.03 | 4 |
| $^{234\text{m}}\text{Pa}$ | 766.36 | 0.02 | 2 |
| $^{234\text{m}}\text{Pa}$ | 766.51 | 0.03 | 2 |
| ^{211}Pb | 766.63 | 0.15 | 2 |
| ^{214}Bi | 768.356 | 0.010 | 2 |
| ^{214}Pb | 785.96 | 0.09 | 3 |
| ^{214}Bi | 786.1 | 0.4 | 3 |
| $^{234\text{m}}\text{Pa}$ | 786.27 | 0.03 | 3 |
| ^{214}Bi | 806.174 | 0.018 | 3 |
| ^{214}Bi | 821.18 | 0.03 | 4 |
| ^{211}Pb | 832.01 | 0.03 | 4 |
| | 839.05 | 0.06 | 4 |
| ^{214}Bi | 904.29 | 0.10 | 4 |
| ^{214}Bi | 934.061 | 0.012 | 4 |
| | 946.04 | 0.10 | 4 |
| ^{214}Bi | 964.08 | 0.03 | 4 |
| $^{234\text{m}}\text{Pa}$ | 1001.7 | 0.1 | 3 |
| ^{214}Bi | 1032.37 | 0.08 | 4 |
| ^{214}Bi | 1033.3 | 0.2 | 4 |
| ^{214}Bi | 1051.96 | 0.03 | 4 |
| ^{214}Bi | 1069.96 | 0.08 | 4 |
| ^{214}Bi | 1103.64 | 0.19 | 4 |
| ^{214}Bi | 1104.79 | 0.19 | 4 |
| ^{214}Bi | 1120.287 | 0.010 | 1 |
| ^{214}Bi | 1130.29 | 0.19 | 4 |
| ^{214}Bi | 1133.66 | 0.03 | 4 |
| ^{214}Bi | 1155.19 | 0.02 | 3 |
| ^{214}Bi | 1172.98 | 0.10 | 4 |
| $^{234\text{m}}\text{Pa}$ | 1193.77 | 0.003 | 4 |
| ^{214}Bi | 1207.68 | 0.03 | 4 |
| ^{214}Bi | 1238.110 | 0.012 | 1 |
| ^{214}Bi | 1280.96 | 0.02 | 3 |
| ^{214}Bi | 1303.76 | 0.08 | 4 |
| ^{214}Bi | 1316.96 | 0.15 | 4 |
| ^{214}Bi | 1377.669 | 0.012 | 1 |
| ^{214}Bi | 1385.31 | 0.03 | 3 |
| ^{214}Bi | 1401.50 | 0.05 | 3 |

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: **Uranium Ore ($^{238}\text{U} + ^{235}\text{U}$ with daughters)**Half Life: $4.468(3) \times 10^9$ yr. + $7.038(5) \times 10^6$ yr. E_γ , σE_γ - 1998 ENSDF Data For I_γ , σI_γ - 1998 ENSDF Data, See: ^{226}Ra , ^{235}U , and ^{238}U SpectraDetector: 65 cm³ coaxial Ge (Li)

Method of Production: Natural Radioactivity

| Isotope | E_γ (keV) | σE_γ | S |
|---|------------------|-------------------|---|
| ^{214}Bi | 1385.31 | 0.03 | 3 |
| ^{214}Bi | 1401.50 | 0.05 | 3 |
| ^{214}Bi | 1407.98 | 0.04 | 2 |
| ^{214}Bi | 1479.15 | 0.14 | 4 |
| ^{214}Bi | 1509.228 | 0.015 | 3 |
| ^{214}Bi | 1538.50 | 0.06 | 4 |
| $^{214}\text{Bi} + \text{sum}(734+609)$ | 1543.32 | 0.06 | 4 |
| ^{214}Bi | 1583.22 | 0.04 | 3 |
| ^{214}Bi | 1594.73 | 0.08 | 4 |
| ^{214}Bi | 1599.31 | 0.06 | 4 |
| ^{214}Bi | 1636.3 | 0.2 | 4 |
| ^{214}Bi | 1657.00 | 0.19 | 4 |
| ^{214}Bi | 1661.28 | 0.06 | 2 |
| ^{214}Bi | 1683.99 | 0.04 | 3 |
| ^{214}Bi | 1729.595 | 0.015 | 1 |
| $^{234\text{m}}\text{Pa}$ | 1737.73 | 0.01 | 4 |
| ^{214}Bi | 1764.494 | 0.014 | 1 |
| | 1782.3 | 0.4 | 4 |
| $^{234\text{m}}\text{Pa}$ | 1831.3 | 0.1 | 4 |
| ^{214}Bi | 1838.36 | 0.05 | 3 |

| Isotope | E_γ (keV) | σE_γ | S |
|--|------------------|-------------------|---|
| $^{214}\text{Bi} + \text{sum}(609+1238)$ | 1847.420 | 0.025 | 1 |
| ^{214}Bi | 1873.16 | 0.06 | 3 |
| $^{234\text{m}}\text{Pa}$ | 1874.85 | 0.10 | 3 |
| ^{214}Bi | 1890.30 | 0.15 | 4 |
| ^{214}Bi | 1895.92 | 0.14 | 4 |
| ^{214}Bi | 1898.7 | 0.4 | 4 |
| $^{234\text{m}}\text{Pa}$ | 1911.17 | 0.10 | 4 |
| ^{214}Bi | 1935.5 | 0.2 | 4 |
| ^{214}Bi | 2010.78 | 0.12 | 4 |
| ^{214}Bi | 2021.6 | 0.2 | 4 |
| ^{214}Bi | 2052.94 | 0.12 | 4 |
| ^{214}Bi | 2089.70 | 0.20 | 4 |
| ^{214}Bi | 2109.92 | 0.12 | 4 |
| ^{214}Bi | 2118.55 | 0.03 | 1 |
| ^{214}Bi | 2147.9 | 0.2 | 4 |
| ^{214}Bi | 2192.58 | 0.16 | 4 |
| ^{214}Bi | 2204.21 | 0.04 | 1 |
| ^{214}Bi | 2251.6 | 0.2 | 4 |
| ^{214}Bi | 2260.3 | 0.2 | 4 |

| Isotope | E_γ (keV) | σE_γ | S |
|-------------------|------------------|-------------------|---|
| ^{214}Bi | 2266.51 | 0.13 | 4 |
| ^{214}Bi | 2293.40 | 0.12 | 1 |
| ^{214}Bi | 2312.4 | 0.2 | 4 |
| ^{214}Bi | 2331.3 | 0.2 | 4 |
| ^{214}Bi | 2376.9 | 0.2 | 4 |
| ^{214}Bi | 2447.86 | 0.10 | 1 |
| ^{214}Bi | 2505.4 | 0.2 | 4 |
| ^{214}Bi | 2694.7 | 0.2 | 2 |
| ^{214}Bi | 2699.4 | 0.3 | 4 |
| ^{214}Bi | 2769.9 | 0.2 | 2 |
| ^{214}Bi | 2785.9 | 0.2 | 3 |
| ^{214}Bi | 2880.3 | 0.2 | 3 |
| ^{214}Bi | 2893.5 | 0.2 | 3 |
| ^{214}Bi | 2921.9 | 0.2 | 2 |
| ^{214}Bi | 2978.9 | 0.2 | 2 |
| ^{214}Bi | 3000.0 | 0.2 | 2 |
| ^{214}Bi | 3053.9 | 0.2 | 1 |
| ^{214}Bi | 3081.7 | 0.3 | 2 |
| ^{214}Bi | 3142.6 | 0.4 | 4 |
| ^{214}Bi | 3183.6 | 0.4 | 4 |

