Geologically Important Radioactive Elements Used for Radiometric Dating

Parent Isotope	**Daughter Decay Product**	**Approximate Half-life** (years)	**Useful Dating Range** (years)	**Materials That Can be Dated**
Samarium-147 ^{147}Sm	Neodymium-143 ^{143}Nd	106 billion	10 million - 4.6 billion	Garnets, lunar fragments, and meteorites
Rubidium-87 ^{87}Rb	Strontium-87 ^{87}Sr	49.7 billion	10 million - 4.6 billion	Potassium-bearing minerals (mica, feldspar, hornblende), whole igneous or metamorphic rock
Uranium-238 ^{238}U	Lead-206 ^{206}Pb	4.5 billion	10 million - 4.6 billion	Uranium-bearing minerals (zircon, apatite, uraninite)
Uranium-235 ^{235}U	Lead-207 ^{207}Pb	703 million	10 million - 4.6 billion	Uranium-bearing minerals (zircon, apatite, uraninite)
Potassium-40 ^{40}K	Argon-40 ^{40}Ar	1.3 billion	100,000 - 4.6 billion	Potassium-bearing minerals (mica, feldspar, hornblende), igneous or metamorphic rock
Carbon-14 ^{14}C	Nitrogen-14 ^{14}N	5730	100 - 70,000	Organic materials, glacial ice containing carbon dioxide, groundwater, and ocean water