

Location: Vaughan Hall, Rm. 300

Time: Tuesday-Thursday: 12:30 - 1:50 p.m.

Instructors: Pat Castillo (3131 Sverdrup Hall, pcastillo@ucsd.edu)

Jeff Severinghaus (211 Vaughan Hall, jseveringhaus@ucsd.edu)

References*: on reserve in Rm 10, Old Scripps Building

Grading (Letter grade):

20% Homework

20% Midterm

60% Final Exam

Tentative class schedule:

10 Jan	PC	Intro to isotope geology, nucleosynthesis, radioactive decay and growth
12 Jan	PC	Trace element geochemistry, mass spectrometry
17 Jan	PC	Radiogenic isotope geochemistry, Rb-Sr isotope systematics
19 Jan	PC	Sm-Nd isotope systematics
24 Jan	PC	Two-component mixtures
26 Jan	PC	Pb isotope systematics; the Sr-Nd-Pb mantle tetrahedron
31 Jan	PC	Pb paradoxes and mantle geodynamics;
2 Feb	PC	Lu-Hf & Re-Os isotope systematics ;
7 Feb	PC	K-Ar and $^{40}\text{Ar}/^{39}\text{Ar}$ methods of dating, extinct radionuclides
9 Feb	PC	Mid-term
14 Feb	JS	Noble gases as tracers in the solid earth, ocean, and atmosphere
16 Feb	JS	Cosmogenic isotopes I – Surface exposure dating, ^{10}Be and ^{36}Cl
21 Feb	JS	Cosmogenic isotopes II – Carbon-14 as tracer and clock
23 Feb	JS	Principles of isotope fractionation and water isotopes I
28 Feb	JS	Principles of isotope fractionation and water isotopes II
2 March	JS	Oxygen isotopic composition of carbonate shells/paleothermometry
7 March	JS	Carbon isotopes; photosynthetic fractionation; major reservoirs
9 March	JS	Carbon isotopes; applications
14 March	JS	Nitrogen Isotopes
16 March	JS	Sulfur Isotopes

Final exam: Tuesday, 11:30 a.m. – 2:29 p.m., 21 March

*** References:**

Faure, Gunter. Principles of isotope geology, Wiley, c1986
QE501.4.N9 F38 2005

Allègre, Claude J., Isotope geology, Cambridge University Press, 2008
QE501.4.N9 A45 2008

Dickin, Alan P., Radiogenic isotope geology, Cambridge University Press, 2005
QE501.4.N9 D53 2005

H.-G. Attendorn and R.N.C. Bowen, Radioactive and Stable Isotope Geology, Chapman & Hall
QE501.4.N9 A895 1997

Robert Bowen, Isotopes in the earth sciences
QE501.4.N9 B69 1988