

DESCRIPTIONS OF ENVIRONMENTAL NATURAL MATRIX STANDARDS

These SRMs are intended for use in tests of measurements of environmental radioactivity contained in similar matrices, for evaluating analytical methods, and as generally available calibrated "real" sample matrices for interlaboratory comparisons.

SRM 4350B - Columbia River Sediment

This material, provided in 85 g units, was collected from a river downstream from a nuclear reactor facility. Concentrations of fission and activation products are elevated over typical world-wide levels. Plutonium-239/plutonium-240 and americium-241 are very homogeneous and are in acid-leachable forms. Inhomogeneity is less than 3% for other radionuclides.

SRM 4351 - Human Lung

This material, provided in 45 g units, contains radioactivity concentrations on the order of 10^{-4} Bq·g⁻¹. It has been freeze-dried, cryogenically ground, homogenized, and packed in a glass bottle under vacuum. There is significant inhomogeneity in the plutonium-239+240 concentration, which is unavoidable because plutonium was taken into the lungs in particulate form. Assessments of accuracy of measurement technique can be improved by averaging over several samples.

SRM 4352 - Human Liver

This material, provided in 45 g units, contains radioactivity concentrations on the order of 10^{-4} Bq·g⁻¹. It has been freeze-dried, cryogenically ground, homogenized, and packed in a glass bottle under vacuum.

SRM 4353A - Rocky Flats Soil Number II

This material, provided in 85 g units, was collected at Rocky Flats, CO, but in a different location from its predecessor, SRM 4353. Transactinide concentrations are about an order of magnitude higher than typical worldwide levels and there is a potential that ~10% of these nuclides could be in refractory form. It is possible that ~15% of the uranium and thorium nuclides present are not in acid-leachable forms. The SRM is intended for use in validation of radiochemical environmental studies methods.

RM 4354 - Freshwater Lake Sediment

This material (gyttja) is provided as approximately 25 g of freeze-dried, pulverized freshwater lake sediment (approximately 50% organic matter by mass) in a polyethylene bottle. Concentrations of fission and activation products are elevated over typical world-wide levels. Plutonium-239+240 and americium-241 are very homogeneous and are in acid-leachable forms. Inhomogeneity is less than 3% for other radionuclides.

SRM 4355A - Peruvian Soil

This material, provided in 75 g units, has nonmeasurable radioactivity concentrations for many fallout radionuclides and can be used as a blank or for sensitive tests of radioanalytical procedures at low radioactivity concentrations. The results of a trace element study are given for 57 elements.

SRM 4356 - Ashed Bone

This material, provided in 15 g units, is a partially ashed sample of a 1:100 composite of human and bovine bones. The SRM is intended for use in validation of radiobiochemical methods for measurement of such radionuclides as strontium-90, radium-226, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235, uranium-238, plutonium-238, plutonium-239+240, and curium-243+244. The thorium-232 and uranium-238 decay chains are not in equilibrium.

SRM 4357 - Ocean Sediment

This material, provided in 80 g units, consists of a blend of sediments collected in the Chesapeake Bay and in the sea off of the British Nuclear Fuels Sellafield facility in the United Kingdom. The SRM, which has been freeze-dried, pulverized, homogenized, and radiation-sterilized, is intended for use in tests of low level radiochemical methods for measurement of such fission products as strontium-90 and cesium-137 and actinides such as thorium-232, uranium-238, and plutonium-239+240.

SRM 4358 - Ocean Shellfish In Preparation

This material, provided in ~300 g units, was prepared from oysters from the southeastern Pacific Ocean blended with mussels from the White and Irish Seas. The SRM is intended for use in the validation of radiochemical methods on material which is both a food product and a bioaccumulator of radionuclides associated with ocean nuclear waste dumping programs. The radionuclides determined include strontium-90, radium-226, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235, uranium-238, plutonium-238, and plutonium-239+240.

SRM 4359 – Seaweed

This material, provided in 300 g units, is a blend of three different seaweed species, which were collected off the western coast of Ireland and the White Sea: *Fucus vesiculosus*, *Laminaria saccharina*, and *Ascophyllum nodosum*. The material is certified for the following radionuclides: Potassium-40, Cesium-137, Lead-210, Polonium-210, Radium-228, Thorium-232, Uranium-234, Uranium-235, Uranium-238, Plutonium-238, Plutonium-239, Plutonium-239+240 and Americium-241. This SRM is intended: for use in tests of measurements of radioactivity contained in matrices similar to the sample; for evaluating analytical methods; and as a generally available calibrated: “real” sample matrix for laboratory intercomparison.