

ETRAC LABORATORIES, INC. STANDARDS & REAGENTS FOR THE PERALS® SYSTEM

EXTRACTIVE SCINTILLATORS

Extractive scintillators are both scintillator and extractant. They are aqueous-immiscible organic solutions that quantitatively and selectively phase-transfer a radionuclide from an aqueous sample into the organic scintillator when the aqueous sample and the extractive scintillator are mixed to produce a dispersion of one phase in the other. Extractive scintillators eliminate variable quenching and background problems, and, since they are often selective, aid in identifying the analyte nuclide.

Extractive scintillators are manufactured from carefully purified, optically transparent ingredients and are sold in 200 mL units except for **RADAEX**® which is sold in 100 mL units. The extractive scintillators are deoxygenated and saturated with argon when manufactured and are kept refrigerated until shipped so as to insure you of quality reagents.

<u>Part No.</u>	<u>EXTRACTIVE SCINTILLATOR</u>	<u>UNIT</u>
SX-01	ALPHAEX ®, Actinide Extracting Scintillator	200 mL
SX-02	URAEX ®, Uranium Extracting Scintillator	200 mL
SX-03	POLEX ®, Polonium Extracting Scintillator	200 mL
SX-04	THOREX ®, Thorium Extracting Scintillator	200 mL
SX-05	RADAEX ®, Radium Extracting Scintillator	100 mL
SX-06	RADONS ®, Radon Extracting Scintillator	200 mL
EX-01	STRONEX §®, Strontium Extracting Scintillator	200 mL

***STRONEX**§® is a selective strontium extractant for beta-liquid-scintillation measurements.

NON-EXTRACTING SCINTILLATOR

This aqueous-immiscible scintillator is identical to the extractive scintillators except that it contains no extractant. It is used for analyzing pre-extracted organics or diluting extractive-scintillator samples if the count rate is found to be too high.

NX-01	NONEX ®, Non-Extracting Scintillator	200 ml
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PURIFIED EXTRACTANTS

The extraction reagents listed below are purified by molecular distillation or precipitation/crystallization and are offered for compounding your own extractive scintillators or for use in chemical separations research.

<u>Part No.</u>	<u>PURIFIED REAGENTS</u>	<u>UNIT</u>
ER-01	High-Molecular-Weight Tertiary Amine	100 g
ER-02	High-Molecular-Weight Primary Amine	100 g
ER-03	Bis(2-ethylhexyl)hydrogen Phosphate	100 g
ER-04	Trioctylphosphine Oxide	100 g

EXTRACTANT SOLUTIONS

The extractants may be obtained in solution in toluene without the scintillator components for use in separation procedures or analytical procedures.

<u>Part No.</u>	<u>EXTRACTANT SOLUTION</u>	<u>UNIT</u>
ES-01	0.2 M High-Molecular-Weight Tertiary Amine	100 mL
ES-02	0.2 M High-Molecular-Weight Primary Amine	100 mL
ES-03	0.2 M Bis(2-ethylhexyl)hydrogen Phosphate	100 mL
ES-04	0.2 M Trioctylphosphine Oxide	100 mL

For the preliminary extraction in the **ETRAC**[®] plutonium procedure. Must be converted to the nitrate salt form prior to use by the analyst.

ES-05	0.3 M High-Mol.-Wt. Amine. After conversion this is "TANO"	100 mL
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SEALED REFERENCE COUNTING SAMPLES

These reference samples are designed to be used to establish appropriate response of the PERALS[®] spectrometer, to determine that the spectrometer is operating properly and that the alpha peak sought for analysis is in the correct position on the display. They also provide visual guidance as to the appearance of the alpha spectrum sought. Since the counting efficiency of the PERALS[®] spectrometer is always constant (99.7%) as long as all of the alpha peak is visible and pulse shape discrimination is set properly, standards are not required for establishing counting efficiency. A count rate is, however, provided with each reference counting sample. In addition, both an energy spectrum and a time spectrum of the reference sample are included. All the instrument settings used to obtain the spectra are recorded and provided.

Although samples with more than one peak can be used to obtain an energy/channel relationship it is better to do this with your own sample and solutions since each type of extractive scintillator has slightly different light production properties.

One milliliter of extractive scintillator containing the nuclide (less than 2 nCi), sealed under an argon atmosphere, in a 10-mm-diameter, 75-mm-long glass tube:

<u>Part No.</u>	<u>REFERENCE SAMPLES</u>
CSUN	Uranium, Normal
CSUD	Uranium, depleted
CSU-235 Uranium-235
CSUE	Uranium, enriched (1 to 2%)
CSTh-230	Thorium-230
CSRa-226	Radium-226
CSPo-210	Polonium-210
CSPu-238	Plutonium-238
CSPu-239	Plutonium-239 CSAm-241
CSAm-241	Americium-241

Please remember gaseous-diffusion enrichment concentrates U-234 even more effectively than U-235. This, plus the higher specific activity of U-234, results in U-234 dominating the alpha spectrum of enriched uranium. Depleted uranium and normal uranium clearly show peaks for both U-238 and U-234. Standards traceable to an NIST standard may be available on special order.

ACCESSORIES

Silicone Fluid

LC-01, 16-oz bottle, for light coupling in the PERALS® detector

HELLO PERALS®!

HP-01, HELLO PERALS® Kit

A demonstration/introduction/instruction kit for the PERALS® system of alpha assay. It contains all of the special glassware and reagents necessary to perform separations and analyses of two (included) sample materials. Sufficient materials and step-by-step instructions for three types of assays are included.

Sparging Gas Conditioner

GC-01, Gas Conditioner

This is a complete, integrated apparatus for drying sample-sparging gas and saturating it with dry toluene or other solvent. The apparatus is compact, portable and designed for simple and efficient operation.

Radon-in-Water Kit

RS-01, Radon-in-Water-Kit

This kit contains equipment and instructions for the **ETRAC**[®]-developed method for radon in water using **RADONS**[®], radon extracting scintillator. The kit includes special sample tubes, septum-cap sample bottles, two hypodermic syringes and special needles, a special curved needle, and sample vial holder. Our tests have indicated the method to be more rapid and more accurate than presently-used methods. The lower limit of detection appears to be in the range 1 to 5 picocuries per liter of water. Accuracy depends on the counting time and the care with which the procedure is done, but ± 5% is probably about right for routine analyses. Equipment and reagents for 65 determinations.

Radon Analysis Supplies

EPA-type vials with septum closures, 65 each
Radon counting cells

Glassware and Related Supplies

Pasteur Pipettes, 9 in	per 250
Culture Tubes, 10 X 75mm	per 500
Vinyl caps for above tubes	per 500
Vials, 2 dram, with polyseal screw cap	per 144
Vials, shell (no closure)	per 144
Funnels, separatory, 30 mL, 125 mL and 250 mL	Ask for quotation

*We appreciate your business. We believe in the **PERALS**[®] system of alpha analysis and look forward to its widespread acceptance and use. Let us know if we can help you. In addition, we would be pleased to hear of your successes with **PERALS**[®].*

Simple questions regarding the PERALS system will be answered without charge. You can contact ETRAC Laboratories, Inc. (865) 482-3427; Fax (865) 483-8404 or ORDELA, Inc. (865) 483-8675; Fax (865) 483-8404. We are equipped to outline analytical procedures for alpha-emitting nuclides from most kinds of samples and to outline separation procedures for most metal ion separations. The charge for this work is \$100.00 per hour. This price includes a written procedure outline and a reasonable amount of charge-free trouble shooting as the procedure is reduced to practice. On-site consulting can also be arranged at a charge of \$800.00 per day (not including expenses).

ETRAC Laboratories, Inc. offers these products in good faith and exercises every precaution at our command to assure they are of good quality and will perform as stated. However, we cannot be responsible for any result from their use beyond replacement of defective items.

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