

OLD DOMINION UNIVERSITY

Office of Radiation Safety
Norfolk, Virginia 23529-0017
804-440-4495

July 23, 1987



Ms. Diane Heim
U. S. Nuclear Regulatory Commission, Region II
Division of Radiation Safety & Safeguards
Nuclear Material Safety Section
101 Marietta Street, Suite 2900
Atlanta, Georgia 30323

Re: License No. 45-09599-03

Dear Ms. Heim:

Please amend license number 45-09599-03 of Old Dominion University to add Cobalt-57 in quantity of 200 millicuries. This source is contained in a New England Nuclear Mossbauer Effect Source (see attached) which one of our Physics Professors wishes to purchase.

Thank you for your attention to this request.

Sincerely,

Anthony L. Towns

Anthony L. Towns
Radiation Safety Director
Old Dominion University

ALT/pjp

RECEIVED BY	8/3/87
DATE	Aug. 1-11
BY	Kusni
TIME	8/4/87

FEE EXEMPT
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Mössbauer Effect Sources and Absorbers

COBALT-57 SOURCES

Custom Mössbauer Sources

New England Nuclear's Mössbauer sources are prepared individually to meet the specific requirements of the researcher. Our sources are prepared by electrodeposition of carrier-free ^{57}Co onto a high purity foil matrix and subsequent diffusion of the cobalt into the foil by a controlled annealing process.

Specifications

Each NEN ^{57}Co Mössbauer source is accompanied by a single velocity spectrum run against 0.1mg $^{57}\text{Fe}/\text{cm}^2$ (6 μm thick) natural iron foil. The six line spectrum offers direct velocity calibration. NEN guarantees our ^{57}Co sources to have linewidths $\leq 0.25\text{mm/sec.}$ for the inner pair of lines in the iron hyperfine spectrum. The background corrected dip of the outer two transitions will be guaranteed $\geq 10\%$. All data represents measured values at 25°C.

Source Dimensions

The standard ^{57}Co source foil (NER-072) is a 12.5mm diameter disc. The active area is normally 6mm or 8mm in diameter (3mm available in some sources - please inquire). The source is sprayed with a very thin coating of acrylic plastic to retard oxidation. If requested, the foil may be mounted in the customer's holder usually at no additional charge.

For added protection against damage and accidental contamination, NEN offers an encapsulated mount (NER-072A). This source is sealed in a 16mm diameter acrylic disc (3mm thick) with an integral 0.25 to 0.64mm window. A cryogenic mount is also available for low temperature studies at an additional cost of \$165.

Accessories supplied with your source:

Velocity spectra
Custom designed lead storage shield
Choice of any four natural absorber foils of iron or 310 stainless steel.

Absorber	Thickness (mg $^{57}\text{Fe}/\text{cm}^2$)
NER-503 Rolled foil, 310 stainless steel	0.3 (25 μm) 0.06 (5 μm)
NER-504 Rolled foil, Iron	0.4 (25 μm) 0.2 (12 μm) 0.1 (6 μm)

Ordering Information

When placing an order, please specify the source activity, desired active area, matrix and thickness, and choice of absorbers.

Custom Cobalt-57 Mössbauer Source

NER-072		
\$425/1mCi	\$ 495/2mCi	\$ 678/5mCi
\$882/10mCi	\$1338/25mCi	\$2032/50mCi
(Larger sources quoted on request.)		

NER-072A		
Encapsulated in an acrylic disc, with accessories.		
\$524/1mCi	\$ 585/2mCi	\$ 765/5mCi
\$970/10mCi	\$1425/25mCi	\$2120/50mCi

Matrix	Available Thickness	Linewidth FWHM (mm sec)	Percent Effect	14.4keV Emission	Matrix Excited K X-Rays (keV)	Comments
Copper	12 μm and 25 μm	≤ 0.25	$> 10\%$	50-70%	K α 8.0	Output attenuated by annealing. Unsplit at liquid helium temperature. 12 μm thick foil recommended.
Palladium	12 μm and 25 μm	≤ 0.25	$> 10\%$	$> 80\%$	K α 21.2	Narrowest Γ at high cobalt loadings, ($> 1\text{Ci}/\text{cm.}$). Splits at 25°K.
Platinum	25 μm	≤ 0.25	$> 10\%$	$> 90\%$	L α 9.4 L β 11.1	Splits at 50°K.
Rhodium	6 μm and 12 μm	≤ 0.25	$> 10\%$	$> 90\%$	K α 20.2	Recommended form for low temperature studies splits at $< 1^\circ\text{K.}$