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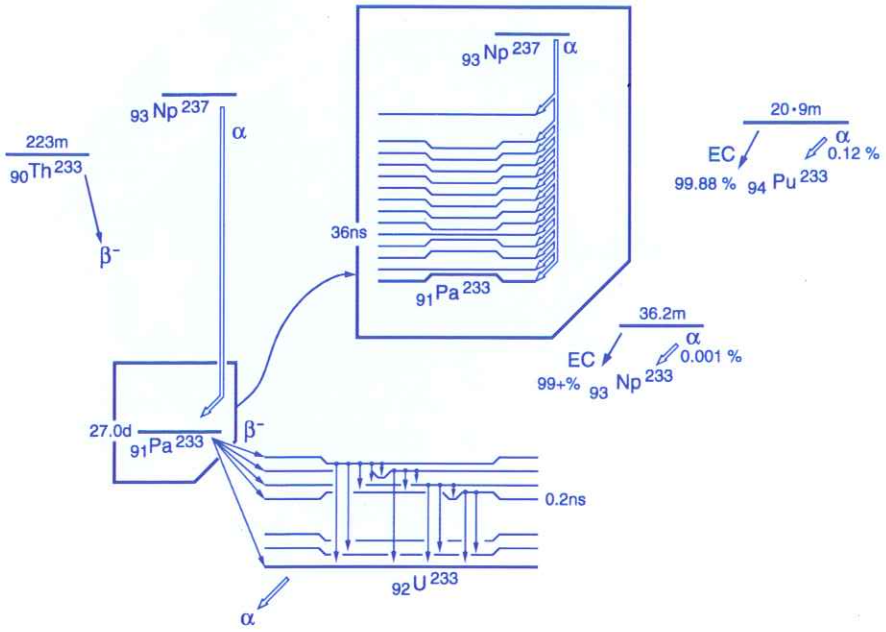

International Committee for Radionuclide Metrology

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EUROPEAN COMMISSION

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LABORATORY	National Institute of Standards and Technology
NAMES	R. Collé
ACTIVITY	Determination of Calibration Factors for the Nondestructive Assay of Pure Beta-Emitting Brachytherapy Sources
RESULTS	Ionization-chamber calibration factors have been determined for two commercially-manufactured intravascular brachytherapy sources: a TiNi-encapsulated ^{32}P source developed by Guidant Intravascular Intervention (Houston, TX), and a stainless-steel encapsulated ^{90}Sr-^{90}Y developed by Bebig Isopentechnic und Umweltdiagnostik GmbH (Berlin, Germany) in collaboration with the Novoste Corp. (Norcross, GA). The calibration factor for the former was derived from ionization current measurements with a Capintec CRC-12 ("dose calibrator") which is the nuclear-medicine community's *de facto* standard instrument, followed by very quantitative, destructive assays of the ^{32}P content in the sources. Similarly, for the former sources, NIST "$4\pi\gamma$ chamber A" calibration factors were determined for both bare ceramic and SS-steel encapsulated source configurations. The assay results used to establish these calibration factors at the same time, resulted in establishing the requisite calibration factors for subsequent nondestructive measurements by their manufacturers, e.g., for in-house quality control.
OTHER RELATED PUBLICATIONS	R. Collé, B. E. Zimmerman, C. G. Soares, and B. M. Coursey, "Determination of a Calibration Factor for the Nondestructive Assay of Guidant ^{32}P Brachytherapy Sources," *in press, Appl. Rad. Iso.* (1998).
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LABORATORY	National Institute of Standards and Technology
NAMES	R. Collé
ACTIVITY	Development of Procedures for the Chemical Digestion and Radionuclidic Assay of Encapsulated, Pure Beta-Emitting, Intravascular Brachytherapy Sources
RESULTS	Very quantitative radiochemical procedures for the destructive assay of encapsulated sources containing pure beta-emitting nuclides have been devised. These types of sources are intended for use in the prophylactic treatment of restenosis following balloon angioplasty in heart-disease patients. The developed methods have been applied to two very different types of sources: a polymer-based, ^{32}P-containing source with TiNi encapsulation; and a ceramic-based ^{90}Sr-^{90}Y source with stainless-steel encapsulation. The internal compositions for both types of sources had constituents that were chemically impervious. The assays involved partial dissolutions (or extractions) followed by $4\pi\beta$ liquid scintillation (LS) spectrometry (with ^{3}H-standard efficiency tracing) of the resulting solutions. The procedures for the former included provisions for accounting for all possible losses of ^{32}P in the digestion procedure (based on radiochemical tracing experiments), for any unrecovered activity in the remaining source material, and for any residual activity in the solution- and source-handling tools. The procedures for the latter source consisted of extracting a fraction of the ^{90}Sr activity from the ceramic-like material for LS assay, and determining the fraction of unextracted activity by before and after ionization current measurements on the extracted source material. The uncertainties in the assays were typically 2% to 4% for two standard uncertainty intervals. These destructive assays were required for relating radiochromic-film measurements of the absorbed dose spatial distributions for the sources to theoretic dose modeling, and for establishing calibration factors for subsequent non-destructive radionuclidic measurements on the sources. The generalized protocols developed for this work have been extended and deployed for the assay of ^{32}P-ion-implanted coronary stents, and will soon be used to perform assays on ^{32}P-containing balloon catheters.
IN PREPARATION	R. Collé, "On the Radioanalytical Methods Used to Assay Stainless-Steel-Encapsulated, Ceramic-Based ^{90}Sr-^{90}Y Intravascular Brachytherapy Sources," *submitted, Appl. Rad. Iso.* (1998).

OTHER RELATED PUBLICATIONS

R. Collé, "Chemical Digestion and Radionuclidic Assay of TiNi-Encapsulated ^{32}P Intravascular Brachytherapy Sources," *in press, Appl. Rad. Iso.* (1998).

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LABORATORY	National Institute of Standards and Technology
NAMES	R. Collé
ACTIVITY	New "Primary" Standardizations of ^{226}Ra and ^{222}Rn
IN PROGRESS	All extant activity standards and calibrations for ^{226}Ra and ^{222}Rn are based on comparative measurements against an artifact radium mass standard (namely the international 1935 Hönigschmid standards and its derivatives). Efforts are currently underway to remove this dependence, and to develop and perform primary standardizations for both ^{226}Ra and the ^{222}Rn subseries based on $4\pi\alpha\beta$ LS spectrometry with ^{3}H-standard efficiency tracing. Work has been completed on successfully employing this new standardization technique to ^{222}Rn, such as for the calibration of the NIST radon-in-water standard generator and for measurements of the polyethylene-encapsulated ^{226}Ra-solution emanation standards (SRM 4968). The techniques are now being extended to the entire ^{226}Ra decay series. Preliminary findings have demonstrated that the method will be able to adequately resolve the ^{210}Pb subseries (i.e., from ^{226}Ra and the ^{222}Rn subseries) in even aged radium solutions. The ability to perform such a resolution is significant in that it will allow direct intercomparisons between the various ^{226}Ra standards issued by NIST over the past 50 years, irrespective of their present degree of radioactive equilibrium between ^{226}Ra and ^{210}Pb.
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