

2 他誌発表

$\beta - \alpha$ 相関事象測定を用いた大気塵埃の自然放射性核種の連続観測 — 核燃料取り扱い施設などからの人工放射性核種のオンライン検知に向けて —

橋本哲夫*, 石山央存, 伊藤成樹**

*新潟大学名誉教授, NRI 研究所代表, **株式会社ゼットコスモス

On the highly sensitive and on-line detection for the contamination of artificial nuclides, much attention has been paid to the elimination of significant problem due to ^{222}Rn -pogenies. A phoswitch-type α - and β -ray radiation counter, which was fixed just above the dust-collecting filter paper within a space in a few mm, provides both α - and β -ray pulses during continuous collection of air-borne dust. Both pulse input times were registered into the memory buffer in a pulse time interval analyzing (TIA) system, followed rapidly by the data processing using MTA (multiple TIA) method. Resultant β - α TIA-spectrum (or decay-curve of β - α correlated events) and changes of α - and β -counting rates were displayed instantly on a PC-display with 1 μs time resolution using installed softwares. Thus, three practical values, including β - α correlated event rates ($n_{\alpha\beta}$), α -(n_{α}), and β -ray counting rates (n_{β}) were available from the present TIA-measurement system. A uranium deposited source (as mixture of α - and β -ray emitters), uranium mineral powder sample, and ^{226}Ra -source (as β -source) showed negligible contribution to β - α correlated events in TIA-spectrum, giving constant α/β counting ratios. In the case of air-borne dust samples, the β - α correlated events in TIA-spectrum showed certainly a presence of 164 μs decay-curve due to ^{214}Po , based on successive decay process such as ^{214}Bi (β) - ^{214}Po (α ; $T_{1/2} = 164 \mu\text{s}$). By using three measuring values, new parameters, R_{α} and R_{β} [equal to $(n_{\alpha} \text{ or } n_{\beta}) * (n_{\alpha} + n_{\beta}) / n_{\alpha\beta}$], have been introduced for the highly sensitive and real-time indicators of contamination owing to artificial nuclides, even under the inevitable existence of ^{222}Rn progenies in the air-borne dust sample. The present radiation measurement system, combined with β - α correlated events, has been proved to be useful for the detection of extremely small contamination with artificial α -nuclides as well as β -nuclides; the detection limit was estimated to be several percents of radioactivity against natural α -nuclides. The present method will be preferable to the *in situ* or remote monitoring of artificial radionuclides from nuclear facilities and so on.

Radioisotopes, 57, 679-694 (2008).

新潟県中越沖地震時の放射線監視センターの対応について

山崎興樹

平成 19 年 7 月 16 日に新潟県中越沖地震が発生した。これにより東京電力(株)柏崎刈羽原子力発電所も大きな影響を受け、全 7 号機が停止する事態となった。

放射線監視センターも断水、都市ガスの供給停止、実験器具等の破損などの被害を受けたが、平成 16 年の中越地震の教訓を踏まえて実施済みであった停電対策、設備の転倒防止対策、通信機器の多重化などの対策が功を奏し、放射線の監視を途絶えることなく継続できた。

また、発電所から微量の放射性物質が漏えいしたとの通報を受け、監視業務を強化し、大気中放射性ヨウ素の調査や海水中の放射性核種の調査を実施したが、いずれも検出されなかった。

さらに、その直後に生じた風評被害の問題に対応するため、海水浴場の海水検査や水産物、農畜産物の検査を実施したが、いずれも発電所から環境中へ放出された放射性核種は検出されなかった。

新潟理化学, 34, 1-13 (2009).

3 学会等発表

浮遊じん放射能の連続モニタリングへの $\beta - \alpha$ 時間間隔解析の応用：

石山央存，土田智弘，黒崎裕人，藤巻廣司，山崎興樹

平成 20 年度放射能分析確認調査技術検討会，東京都千代田区，東京国際フォーラム，平成 20 年 3 月 18 日（平成 20 年度放射能分析確認調査技術検討資料，175-183，2009）。

A new monitoring system of natural radionuclides on air-borne dust sample combined with beta-alpha correlated events as a teaching material for public and student radiation-literacy

Tetsuo Hashimoto*, Hisanobu Ishiyama, Shigeki Itou**

* Emeritus Professor of Niigata University (NRI-Institute), ** Z-COSMOS Ltd.

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