海洋に関する化学的研究 (第 66 報)

汀土の化学的研究 (その 19)

汀土のラジウム含量について (1)*

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Chemical Studies on the Ocean—LXVI

Chemical Studies of the Shallow-water Deposits—19

Radium Content of the Shallow-water Deposits (1)

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Abstract: The radium content of the shallow-water deposits from the sea-coasts of Korea and Japan Proper was determined. In this paper, the analytical results of 67 kinds of deposits are described.

1. 緒 言

先に京都大学石橋雅義教授は常に海水に接している汀土には Ra のような放射性元素を始め或る種の微量ないし稀有元素が海水より吸着捕集され、夫等の生触媒的機能による汀土の呈すべき肥効性を推想されたのであるが、この推想は昭和14年朝鮮不二興業株式会社の西鮮農場の稲作試験田で西沿岸の干潟土につき大規模に試験した結果、見事に的中し、籾、藁に多大の増収を得たのであった。石橋教授はこの干潟土を分析し、普通陸上土壌より遙かに多量の Ra 及び K を含有するのを見出されたのである⁽¹⁾。その後著者は石橋教授に協力し、朝鮮、本州各地の沿岸における多数の汀土につき普通元素に関する化学組成を決定し来つたのであるが⁽²⁾、今回、微量元素定量の第

一段階として Ra の定量を行つた。本報においては朝鮮沿岸の汀土 30 種、本州沿岸の汀土 37 種、計 67 種の汀土の Ra 含量を報告する。

2. ラジウムの定量法

試料を熔融合剤によつて熔融し、塩酸にて処理し、珪酸を除去した濾液につきエマネーション法により精密ラドン計を用いて定量した。

3. 分析結果

試料の採取地名、性状及び Ra 含量を示すと第 1 表の如くなる。なお Ra 含量と他の成分の含量との関係を見るため SiO_2 、 K_2O 、 Fe_2O_3 及び MnO 含量を表に併記した。 SiO_2 及び K_2O は陸上岩石において⁽³⁾、又 Fe_2O_3 及び MnO は深海底土において⁽⁴⁾ Ra 含量と相関関係にあたるものが既に知られている。数値は塩素量より吸着海水由来の塩分を算出して補正し、乾燥試料に換算したものである***。結果の考察は次報において総括して行うこととする。

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Table 1*. Radium content of the shallow-water deposits.

Sample No.	Locality	Type of deposits	Ra (10^{-12} g Ra/g)	SiO ₂	Fe ₂ O ₃	MnO	K ₂ O
K1	Puna, Yongchon-kun, Pyongan-pukto	dark brown mud	0.81	% 53.88	% 9.61	% trace	% 3.04
K2	Osong-tong, Taesan-myon, Sonchon-kun, Pyongan-pukto	dark brown mud	0.51	63.63	8.21	0.05	2.16
K3	Hampal-ri, Hanchon-myon, Pyongwon-kun, Pyongan-namdo	dark brown mud	0.70	68.47	4.64	0.16	2.93
K4	Okyangki-ri, Chinnampopu, Pyongan-namdo	dark brown mud	0.84	65.75	6.87	trace	1.51
K5	Yonghoto-ri, Tongnam-myon, Ongjin-kun, Hwanghae-do	dark brown mud	0.53	70.64	5.04	trace	2.51
K6	Chinjong-ri, Sonwon-myon, Kanghwa-kun, Kyonggi-do	dark brown mud	1.33	62.23	9.06	0.20	2.57
K7	Tongjoung-ri, Soukmun-myon, Tangjin-kun, Chungchong-namdo	dark brown mud	0.88	68.07	6.68	0.20	2.57
K8	Sopinchon, Kunsanpu, Cholla-pukto	dark brown mud	1.09	58.75	13.82	0.05	2.33
K9	Namchang-ri, Pukpyong-myon, Haenam-kun, Cholla-namdo	dark brown mud	0.54	60.00	6.69	trace	3.09
K10	Mayang-ri, Taeku-myon, Kangjin-kun, Cholla-namdo	dark brown mud	0.58	63.74	7.36	trace	2.25
K11	Haean, Kuhangshine, Yosub, Yosukun, Cholla-namdo	dark brown mud	0.42	62.32	7.81	trace	2.28
K12 ₁	Royang-ri, Kumnan-myon, Hadong-kun, Kyongsang-namdo	dark brown sandy mud	0.75	71.71	4.45	0.03	2.66
K12 ₂	Royang-ri, Kumnan-myon, Hadong-kun, Kyongsang-namdo	dark brown mud	0.66	59.54	6.95	0.09	2.31
K13	Sonjin-ri, Yongkyoun-myon, Sachon-kun, Kyongsang-namdo	dark brown sandy mud	0.44	73.19	3.56	0.03	1.70
K14	Tupu-ri, Samsan-myon, Kosong-kun, Kyongsang-namdo	dark brown mud	0.38	63.93	6.70	0.05	2.46
K15	Shinjon-ri, Sanyang-myon, Tongyong-kun, Kyongsang-namdo	dark brown sandy mud	0.63	73.54	6.66	0.05	1.48
K16	Kyonghwa-tong, Chinhae-ub, Changwon-kun, Kyongsang-namdo	brown mud	0.80	65.96	8.78	0.10	2.14
K17	Chedok-ri, Ungchon-myon, Changwon-kun, Kyongsang-namdo	dark brown mud	0.35	63.60	6.48	0.09	1.07
K18	Bangou-ri, Tong-myon, Ulsan-kun, Kyongsang-namdo	yellow clay	0.94	62.67	5.99	0.03	2.70
K19 ₁	Pohang-tong, Pohang-ub, Yongil-kun, Kyongsang-pukto	dark brown mud	0.12	56.30	7.77	0.03	2.47
K19 ₂	Pohang-tong, Pohang-ub, Yongil-kun, Kyongsang-pukto	light yellowish brown sand	0.31	68.99	2.82	0.05	1.81
K20	Imwon-ri, Wondok-myon, Samchok-kun, Kangwon-do	light yellowish brown sand	0.51	81.11	1.82	0.03	2.07
K21	Chumun-ri, Chumunjin-myon, Kangnung-kun, Kangwon-do	yellowish white sand	0.16	83.74	0.87	0.02	3.25

* The Ra content of Sample K1 and the contents of SiO₂, Fe₂O₃, MnO and K₂O of Samples K1~K11 were determined by Prof. M. ISHIBASHI⁽¹⁾ and they are cited here for the convenience of generalized consideration on the analytical results of all the samples from all the Korean sea-coasts.

Sample No.	Locality	Type of deposits	Ra (10^{-12} g Ra/g)	SiO ₂	Fe ₂ O ₃	MnO	K ₂ O
K22	Hae-an-tong, Wonsanpu, Hamgyong-namdo	light yellowish brown sand	0.09	% 72.26	% 2.46	% 0.05	% 2.42
K23	Hengchon, Songjin-ub, Songjin-kun, Hamgyong-pukto	light brown sand	0.40	61.26	7.60	0.11	1.66
K24	Songshin-tong, Ouyang-myon, Kyongsong-kun, Hamgyong-pukto	light brown sand	0.18	66.03	3.68	0.03	3.00
K25	Tokyou-n-tong, Ochon-myon, Kyongsong-kun, Hamgyong-pukto	grayish white sand	2.44	69.21	6.04	0.07	2.53
K26 ₁	Bipa-tong, Songpyong-tong, Unggi-ub, Kyonghung-kun, Hamgyong-pukto	grayish white sand	0.55	79.25	2.07	0.03	2.17
K26 ₂	Ungsang-tong, Unggi-ub, Kyonghung-kun, Hamgyong-pukto	light yellowish brown sand	0.15	75.42	2.07	0.04	2.26
K26 ₃	Unggi-tong, Unggi-ub, Kyonghung-kun, Hamgyong-pukto	grayish white sand	0.20	70.56	2.79	0.01	2.84
K27	Sosura-tong, Roso-myon, Kyonghung-kun, Hamgyong-pukto	grayish white sand	0.13	73.20	1.65	0.03	2.30
1	Ataka-machi, Komatsu-shi, Ishikawa-ken	light brown sand	0.21	78.09	2.52	0.03	2.71
2	Mukōawagasaki, Uchinada-mura, Kahoku-gun, Ishikawa-ken	brown sand	0.19	74.18	3.07	0.04	2.93
3	Takahama, Takahama-machi, Hakui-gun, Ishikawa-ken	light brown sand	0.27	73.06	3.36	0.03	2.60
4	Ōkawa, Machino-machi, Fugeshi-gun, Ishikawa-ken	blackish sand	0.38	61.76	4.41	0.04	2.16
5	Fujinami, Sannami-mura, Fugeshi-gun, Ishikawa-ken	blackish sand	0.70	46.60	5.96	0.02	2.21
6	Mattō, Nanao-shi, Ishikawa-ken	light grayish brown sand	0.46	66.85	3.09	0.02	2.54
7	Kubo, Kubo-mura, Himi-gun, Toyama-ken	light brown sand	0.50	75.68	2.34	0.02	2.86
8	Ebie, Ebie-mura, Imizu-gun, Toyama-ken	light grayish brown sand	0.65	72.77	3.78	0.04	2.65
9	Shimomuraki-machi, Uozu-machi, Shimoniikawa-gun, Toyama-ken	light yellowish sand	0.42	74.88	1.77	0.02	3.22
10	Ikuji-machi, Shimoniikawa-gun, Toyama-ken	small gravel	n. d.	n. d.	n. d.	n. d.	n. d.
11	Shimoarahama, Yachiho-mura, Nakakubiki-gun, Niigata-ken	grayish white sand	0.51	72.63	3.58	0.05	1.77
12	Kujiranami, Kashiwazaki-shi, Niigata-ken	blackish brown sand	0.78	71.29	5.40	0.08	2.08
13	Amaze, Izumozaki-machi, Santō-gun, Niigata-ken	brown sand	0.17	73.22	4.17	0.04	2.12
14	Kawakami, Ikarashihama, Uchino-machi, Nishikambara-gun, Niigata-ken	grayish white sand	0.54	71.97	3.38	0.06	3.16
15	Muramatsuhama, Matsuzuka-mura, Kitakambara-gun, Niigata-ken	grayish white sand	0.50	76.06	2.08	0.03	3.66

Sample No.	Locality	Type of deposits	Ra (10^{-12} g Ra/g)	SiO ₂	Fe ₂ O ₃	MnO	K ₂ O
16	Aburato, Kamo-machi, Nishitagawa-gun, Yamagata-ken	grayish sand	0.38	% 68.90	% 2.79	% 0.04	% 2.73
17	Miyaumi, Nishiarase-mura, Akuumi-gun, Yamagata-ken	grayish white sand	0.41	80.29	2.58	0.04	1.91
18	Yoshigo, Tahara-machi, Atsumi-gun, Aichi-ken	grayish green fine mud	0.17	67.04	4.48	0.04	1.89
19	Ura, Tahara-machi, Atsumi-gun, Aichi-ken	grayish green fine mud	0.30	63.08	7.03	0.06	1.91
20	Namiirie, Oitsu-mura, Atsumi-gun, Aichi-ken	grayish green sandy mud	0.25	77.35	3.34	0.04	1.74
21	Nakane, Terazu-machi, Hazu-gun, Aichi-ken	grayish green sandy mud	0.26	74.25	3.17	0.03	2.55
22	Yoshihama, Takahama-machi, Hekikai-gun, Aichi-ken	grayish green fine mud	0.28	53.19	5.34	0.03	2.05
23	Ishikiri, Kamezaki, Handa-shi, Aichi-ken	grayish green sandy mud	0.48	80.37	2.05	0.03	2.11
24	Nawa, Ueno-machi, Chita-gun, Aichi-ken	grayish green mud	0.16	72.18	3.42	0.02	2.79
25	Sankaku, Shimonoishiki-machi, Nakagawa-ku, Nagoya-shi, Aichi-ken	grayish green fine mud	0.47	64.66	4.47	0.05	2.37
26	Shingai-machi, Fukuyama-shi, Hiroshima-ken	grayish green fine mud	0.69	63.46	4.68	0.07	3.25
27	Minomi-machi, Numakuma-gun, Hiroshima-ken	grayish green fine mud	0.51	56.20	6.07	0.09	2.43
28	Yoshiwa-machi, Onomichi-shi, Hiroshima-ken	grayish green mud	1.12	69.84	3.50	0.04	2.88
29	Nouji, Saizaki-machi, Toyota-gun, Hiroshima-ken	yellowish white sand	0.72	80.29	1.30	0.02	4.08
30	Miyatoko, Tadanoumi-machi, Toyota-gun, Hiroshima-ken	light brown sand	0.66	78.34	1.16	0.01	5.05
31	Kitazaki, Takehara-machi, Kamo-gun, Hiroshima-ken	grayish green fine mud	0.69	64.89	4.69	0.04	2.49
32	Kirasaki, Shimono-mura, Kamo-gun, Hiroshima-ken	grayish green mud	0.83	68.34	3.81	0.03	3.17
33	Mitsu, Akitsu-machi, Kamo-gun, Hiroshima-ken	light grayish brown sand	0.55	81.57	1.33	0.01	3.70
34	Tsukimigahama, Itsukaichi, Itsukaichi-machi, Saeki-gun, Hiroshima-ken	light brown sand	0.29	78.76	1.08	0.01	4.68
35	Karasumori, Uchimichikawa, Michikawa-mura, Yuri-gun, Akita-ken	grayish white sand	0.62	79.99	2.76	0.08	1.68
36	Shimodeto, Tennen-mura, Minamiakita-gun, Akita-ken	brown sand	0.54	69.15	4.66	0.07	2.02
37	Minamihirasawa, Funagawaminato-machi, Minamiakita-gun, Akita-ken	grayish white sand	0.51	31.24	2.56	0.06	1.57
38	Miyasawa, Katanishi-mura, Minamiakita-gun, Akita-ken	brown sand	0.56	71.75	2.85	0.04	1.73

終りに臨み本研究に終始御懇篤な御指導を賜わった京都大学石橋雅義教授に深甚の謝意を表す

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