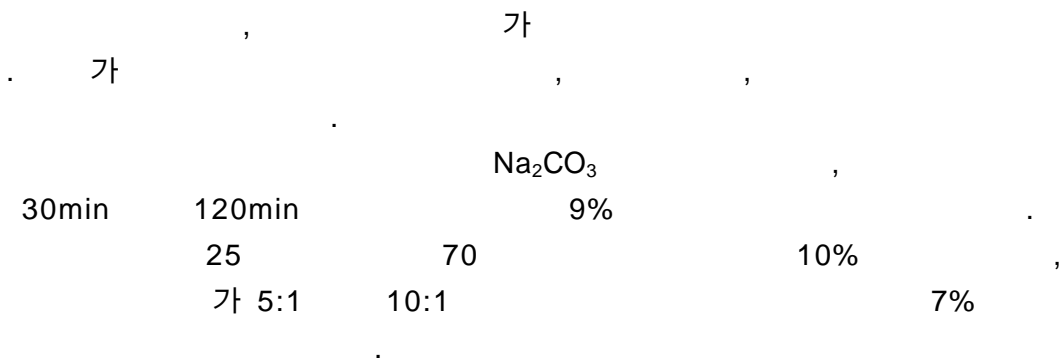


Soil Washing
Cs

A Study on Cs Decontamination Characteristics of
Radioactively Contaminated Soil Using Soil Washing

()

150



Abstract

To decontaminate radioactively contaminated soil, various characteristics of soil were investigated, and applied for the best decontamination method and requirement. The effects of several conditions such as decontamination solutions, temperature and time was investigated.

Na₂CO₃, which is not toxic to environment, was used as primary decontamination solution. The efficiency of decontamination was increased approximately 9% when decontamination time was increased from 30 min to 120 min. The efficiency of decontamination was increased approximately 10% when decontamination temperature was increased from 25 to 70 . The efficiency of decontamination was increased approximately 7% when the ratio of decontamination solution and soil was increased from 5:1 to 10:1.

1.

가

가

가

가

가

가

1980

soil washing

soil flushing

Soil washing

, Soil flushing
pump and treat

2

가

가

가

, matrix

가

가

silt clay 30~50%

가

soil washing

가

2.

2.1

0.1mR/h

2

1

2

2

chlorite 가

2

Quartz 가 42 ~ 54%

chlorite 가 1.1%

1.

()

	2	
Montmorillonite - 15A	Montmorillonite	Clinochlore - 1MIlb, fe
Kaolinite - 1A	Kaolinite - 1A	Kaolinite - 1A
Muscovite - 1M, syn	Muscovite2M1	Muscovite2M1
Magnesiiohornblende	Magnesiiohornblende	Magnesiiohornblende
Clinochlore - 1MIlb, fe	Quartz, low	Quartz, low
Quartz, low	Albite, calcian, ordered	Albite, calcian, ordered
Albite, calcian, ordered	Microcline, intermediate	Microcline, intermediate
Microcline, intermediate	Montmorillonite - chlorite	Calcite

2.

()

	2	
Quartz 42.3	Quartz 54.3	Quartz 42.3
Albite(low) 28.6	Albite(low) 4.3	Albite(low) 28.6
Microcline 9.5	Microcline 9.8	Microcline 9.5
Montmorilionite 7.2	Montmorilionite 18.0	Montmorilionite 7.2
Hornblends 3.2	Hornblends 3.9	Hornblends 3.2
Kaolin(young model) 2.8	Kaolin(young model) 3.2	Kaolin(young model) 2.8
Muscovite 6.4	Muscovite 6.6	Muscovite 6.4
		Chlorite 1.1

(%)

3

6 가

3.

	Gravel		coarse sand	Medium sand	fine sand	silt - clay
	4.76	4.76~2.0	2.0~0.5	0.5~0.21	0.21~0.075	0.075

4
60, Cs - 134, Cs - 137 4.76mm Cs -
가
Cs - 137 2 mm , Cs - 137
가 가 ,

4. 0.1 mR/h

(mm)	()	(wt %)		(Bq/g)		
				Co - 60	Cs - 134	Cs - 137
4.76	coarse sand	18.49	17.2			
4.76 ~ 2		25.87	21.0	0.050	0.204	2.122
2 ~ 0.5	medium sand	29.3	27.2	0.038	0.213	2.123
0.5 ~ 0.21		13.36	11.6	0.108	1.626	5.464
0.21 ~ 0.074	fine sand	9.6	9.2	0.184	0.810	8.604
0.074	silt - clay	3.38	13.8	0.372	1.607	11.181

2.2

0.1mR/h 1.0mR/h 50g
가
10 2 mm
50g

a.
Cs - 137 HCl, H₂SO₄, H₃PO₄, HNO₃,
(NH₄)₂SO₄, Na₂CO₃, NaCl, KCl, NaOH, NH₄HCO₃,
25
1:10(9.1% solids), 120min

b.

30min, 60min, 120min

c.

Soil washing

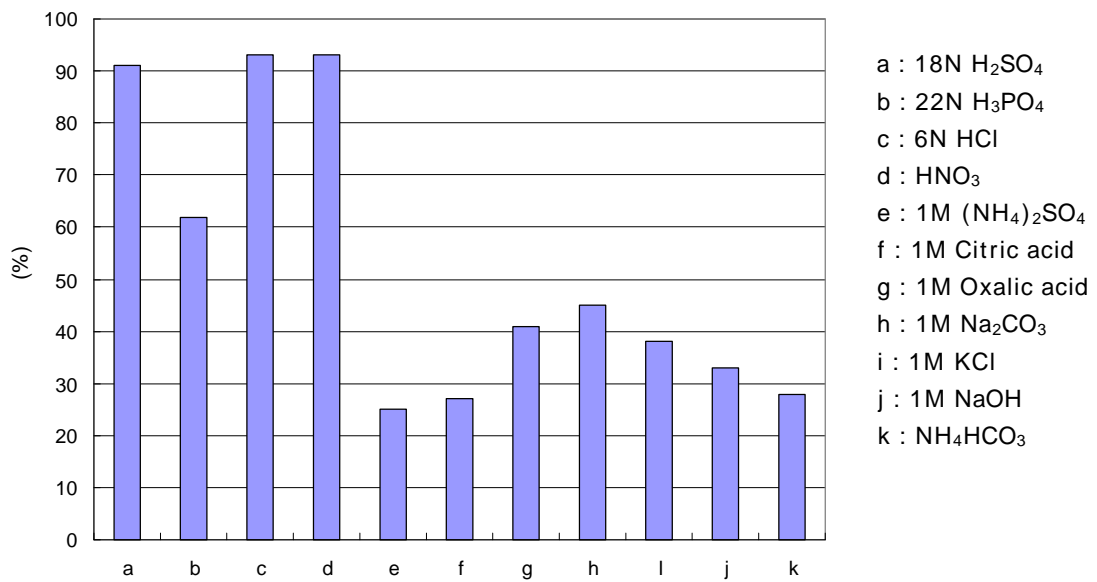
1:5(16.6% solids) 1:10(9.1% solids)

d.

hotplate
55 , 70

(25),

3.



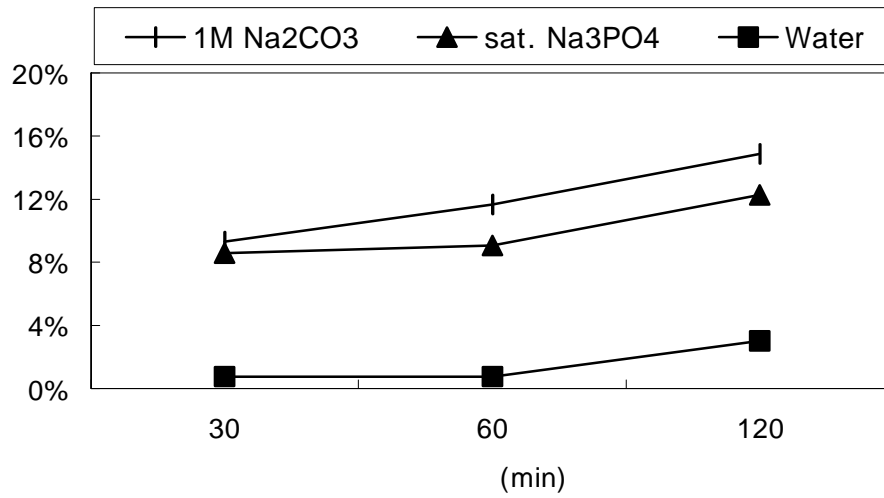
1.

1 가
Co - 60

Cs - 137

Cs - 134 Cs - 137 Cs - 137 Cs - 137 Cs - 137
 Cs - 137 Co - 60
 HCl, HNO₃ 90%가 1 H₂SO₄,
 가 Na₃PO₄ Na₂CO₃
 가

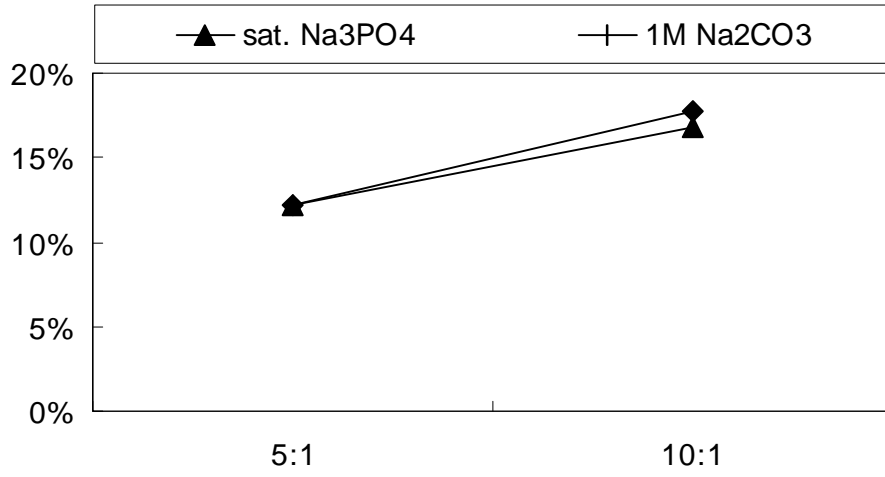
a.
 2
 1M Na₂CO₃ Na₃PO₄,
 55 , 1.0mR/h 10:1
 1M Na₂CO₃ 가 12min 15%
 3%



2.
 (55 , 1.0mR/h, 10:1)

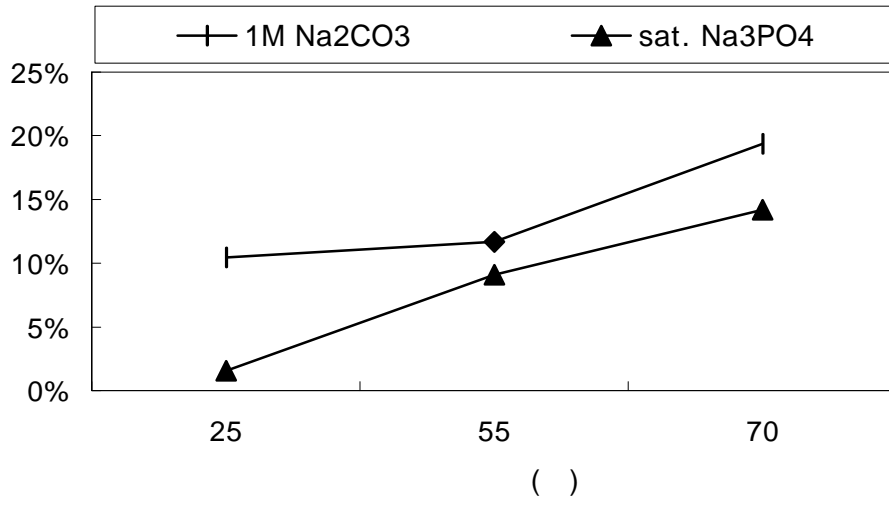
b.
 3 5:1 10:1
 0.1mR/h 55
 30 5%

10:1 , 5;1 Na_2CO_3 Na_3PO_4
 Na_2CO_3 Na_3PO_4
 Cs - 137 가 가
 2 .

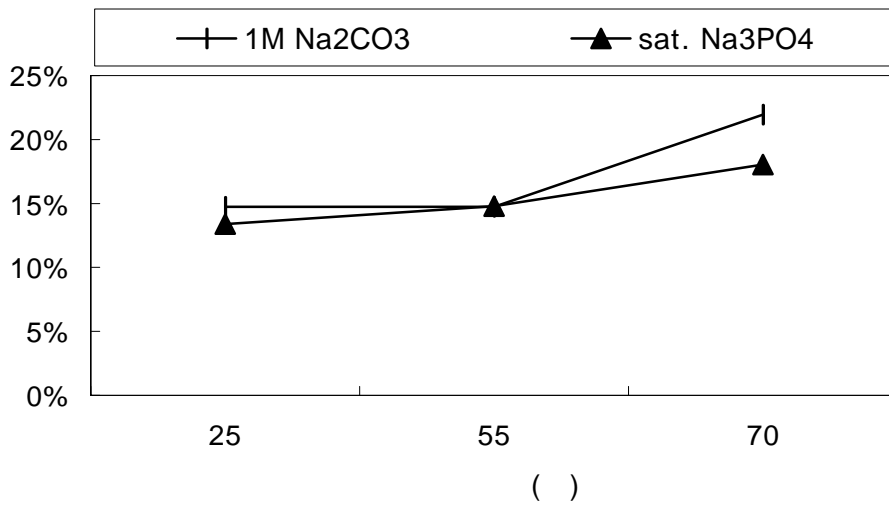


3.
 (55 , 0.1mR/h, 30 min)

c.
 4 5
 가 가 4 5
 120min



4. 60min
 (1.0mR/h, 10:1)



5. 120min
 (1.0mR/h, 10:1)

4.

가 가

가

가

가

Co - 60
가

1) 2mm

Na₂CO₃

2)

3)

4)

Cs - 137, Cs - 134, Co - 60

5.

- 1) U. S. Environmental Protection Agency(1996), “Technology Screening Guide for Radioactively Contaminated Sites
- 2) Robert J. Cena(1994), “Genesis Eco Systems, inc. Soil Washing Process”
- 3) Ahmet Suer Environmental Restoration Engineering. “Soil Washing Technology Evaluation”