

(-Molten Salt Oxidation)

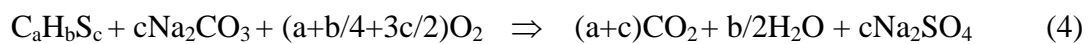
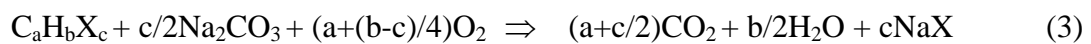
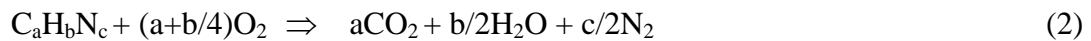
gasification
 LLNL, ORNL, Rockwell
 organics, PCBs TCE
 MSO [1,2,3].
 Rockwell 20 coal
 ETEC,
 molten salt hazardous
 , , laboratory-, bench- pilot-scale
 5
 [4].

[5]

(molten salt oxidation, MSO)
 robust

가 700–950°C
 CO₂ H₂O

halogen sulfur 가
 NaCl Na₂SO₄
 Sodium carbonate 1, 2, 3 4
 X halogen sulfur



LLNL MSO 1
 가 , ,
 / , paper, rags, gloves, booties 7 kg/hr
 feed injection system top-MSO
 vessel salt bed
 fresh salt
 spent salt (salt
 recycle system)
 ceramic matrix

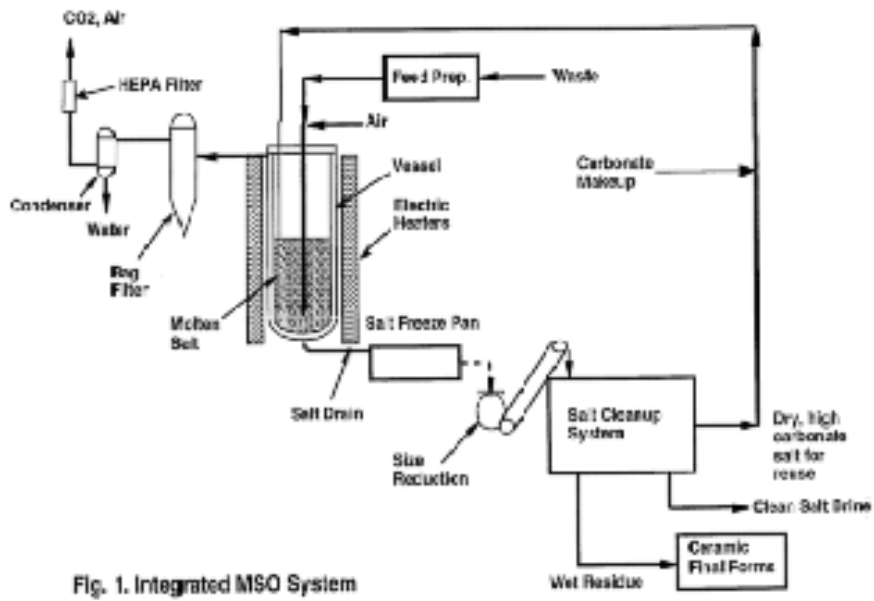


Fig. 1. Integrated MSO System

Process Vessel/Off-gas System

2 (process vessel) off-gas system 2.74
 meter 38.1 cm , 29.8 cm
 30.5 cm 가 (tapered transition
 zone) 160 kg
 (freeboard area) 가 가 (salt level)
 (disengagement zone) (baffle)
 vessel (bottom) injector lance vessel cover
 injector Injector
 1.27cm Inconel 600
 Na_2CO_3 NaCl
 LLNL , NaCl Inconel
 600

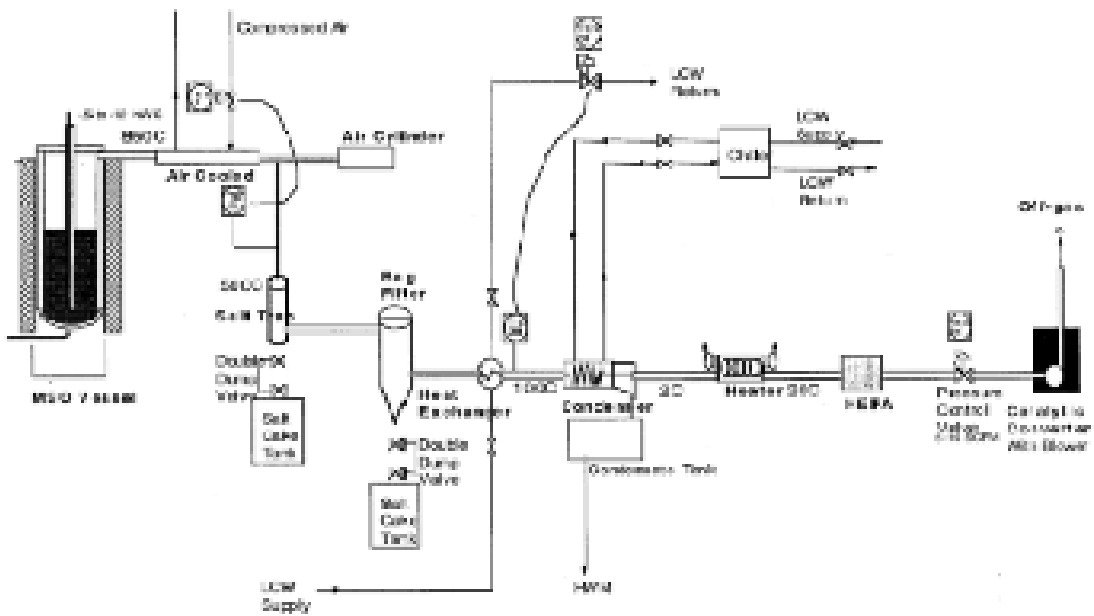


Fig. 2. Process Vessel and Off-Gas Treatment System

(salt deposits)

vessel nozzle rupture disk . Rupture disc
low pressure disk 가

가 vessel 가 Vessel 가
. Vessel salt drain pipe가
가

vessel
heater vessel .
가 gas-to-air cooler 500°C
. Gas-to-air cooler concentric pipes pipes
annular gap 가 annular gap
pipe 가

wire brush vessel
가
. 0.5 μm 700°C
. 6 silicon carbide filter가
가 2.74 kPa (11 inches water)

Salt trap ceramic filter double dump valves
. Double dump valves

300°C
50°C

가 100°C
2°C propylene glycol chiller
가 30°C 가
. MSO system HEPA filter catalytic
converter 가 prefilter off-gas
HEPA filter . off-gas system
catalytic converter 50,000 ppm CO 30,000
ppm NOx . catalytic converter

CO₂ ammonia injection system NO_x
 N₂ H₂O Catalytic converter HEPA
 filter 가 .

Salt Recycle System

3 (salt recycle system) MSO
 vessel off-gas system .

6.3 mm
 tank T-101 spiral conveyor .
 . Tank T-101 .

hydrochloric acid, dithionite pH . Sodium hydroxide,
 가 . Alum[Al₂(SO₄)₃] Activated silica dissolver tank
 가 . T-

101 T-102 metering pumps hatch
 F-101 pumping .
 1 micron .

diatomaceous earth pre-coating . Filter cake
 filter cartridge .
 . Wet cakes .

carbonate radionuclides spray dryer, ion exchange
 columns portable containers . Spent salt가 carbonate
 T-103 spray drying .
 MSO vessel .

Carbonate uranium thorium ion
 exchange column E-101/E-102 .
 portable containers

(Hazardous Waste Management (HWM) of LLNL)

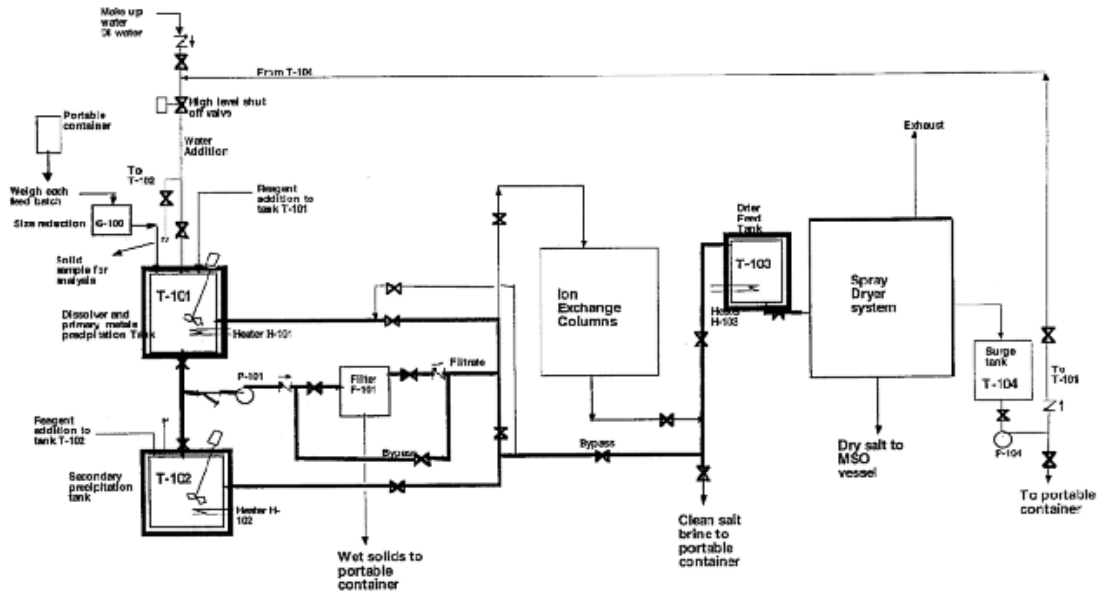


Fig. 3. Salt Recycle System

MSO

1. (95%)
2. base hydrolysate

MSO

1. 가
2. 가

fluctuation

3. MSO 가

/ 가 가

Plutonium

Actinides

TRU

4. MSO

가

5. MSO system
800°C

700-

scrubbing 가 가 alkali salt
wet scrubbing system

MSO

1.

NaF NaCl

2.

/

System

Integrated

REFERENCES

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