

Recycling Technology,
Low cost & Eco-friendly

Reducing organic volume
Ceramic producing machine

ERC M

ERC M : Earth - Resource - Ceramic - Machine

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Features of ERCM

ERCM is a recycle machine

No need for any waste disposal businesses to have ERCM if they dispose of garbage as garbage. Also merely disposing garbage will reach the limit in business.

The garbage is the resource, ERCM that producing ceramic out of organic matters considered to be garbage is the machine supporting for businesses that taking seriously to use effectively the garbage.

Joint researchers

Tokyo Institute of Technology

School of Environment and Society -
Department of Transdisciplinary
Science and Engineering
Global Engineering for Development,
Environment and Society

Kumamoto University

Graduate School of Advanced Science
(Engineering)

● Low cost

- ▶ No auxiliary fuel required (Thermal decomposition of organic matters)
- ▶ Power saving (100,000~150,000 Yen/month, case of 20m³/day machine)
- ▶ Simple and compact structure (No refractory material required)
- ▶ Easy operation, daily care and maintenance (No cooling water required)

● High volume reduction rate

- ▶ All organic matters can be decomposed and reduced the volume by 1/100 ~ 1/500 (Moisture content less than 65%)

● Low pollution

- ▶ Very low Dioxins & NOx's after decomposed
- ▶ No dust and soot coming from decomposing process
- ▶ Produced ceramic powders do contain extremely low carbon
- ▶ Ceramic powders can be utilized after refining
- ▶ The high heat area is so limited and not transferred, so that exhaust heat is very low

Patents

- Domestic Patents No. 4580388, No. 6042297
- US patents US 7, 648, 615 B2
- China patents CN 104456574 B (No. 3439630)
- Other international patents

System of ERCM

Recycle waste to resource w/o waste heat, Toxic gas, noise and vibration

Organic matters can be reduced drastically w/o auxiliary fuel



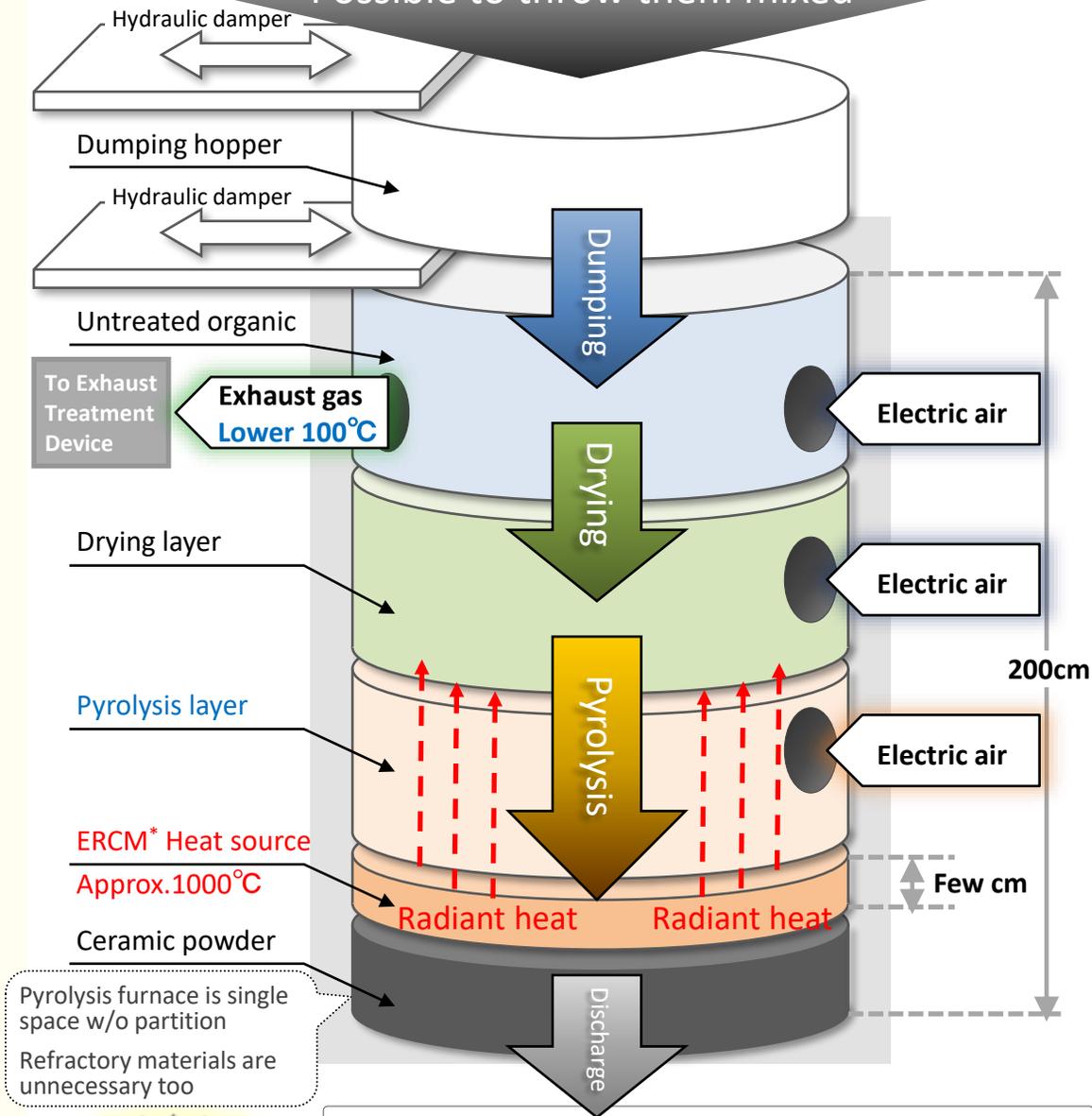
Garbage

Excrement

Waste plastic

Vermin

Possible to throw them mixed



To Exhaust Treatment Device

Exhaust gas
Lower 100°C

Electric air

Electric air

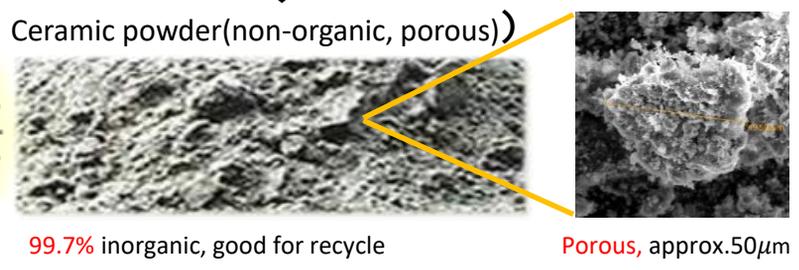
Electric air

200cm

Few cm

Pyrolysis furnace is single space w/o partition
Refractory materials are unnecessary too

Reduction rate
1/100 ~ 1/500



Note: Inorganic matters such as metal, glass, and pottery **do not decompose**, and these are **mixing with ceramics and discharged**

*Electron-induced Redox of Carbonized Materials

Process flow and actual case



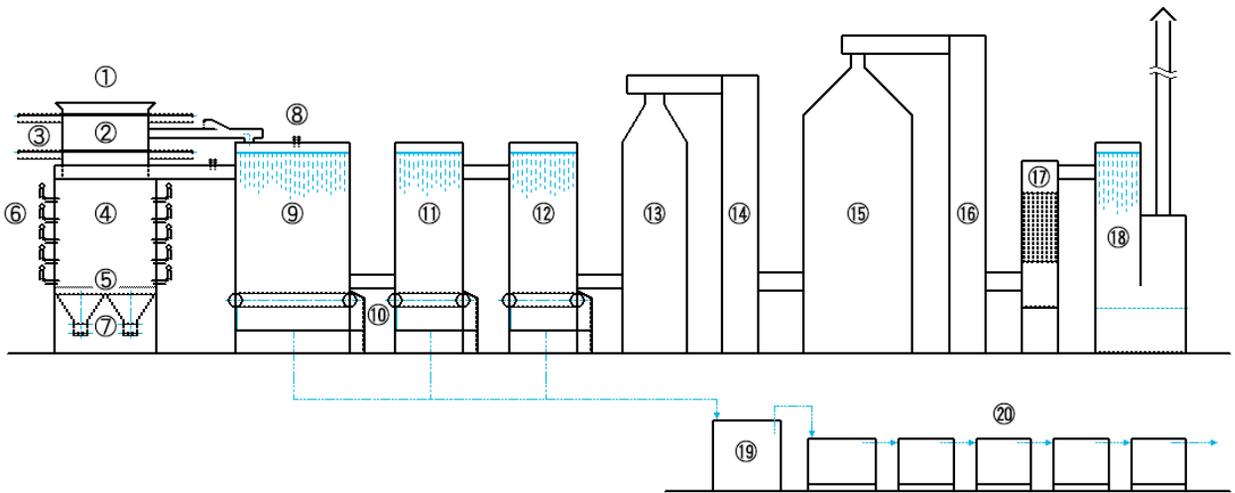
◀ 20m³/day commercial plant
(Food processing Co., in Nagoya)

Exhaust gas data (Oxygen rate 12% conv.)

Item	Result	Standard
NOx (ppm)	8	250
Hydrogen chloride (mg/Nm ³)	120	700
Dust and Soot (g/Nm ³)	0.03	0.15
Dioxins (ng-TEQ/m ³)	1.3	5

Kumamoto University Local associated laboratory,
General waste disposal processing measured data

Process flow of ERCM



① Input port
Place input materials here

② Hopper
Temporary space for input materials preventing out air

③ Gate device
Double damper minimize air leaking

④ Pyrolysis furnace
ERCM main system, ERCM heat source make pyrolysis

⑤ Ceramic layer
Solid residue after process (mainly ceramic powder)

⑥ Electric Ventilation hole
Distribute electric into main system

⑦ Residue Collection hole
Collecting residue from this hole

⑧ Safety valve
Open when the pressure sudden rising

⑨ 1st residential tank
Separating tar and water from holding gas in the tank

⑩ Tar discharge hole
Discharging separated tar

⑪ Wet scrubber
Cleaning gas by water

⑫ 2nd residential tank
Separating tar and water again from holding gas in the tank

⑬ Gas control tower
Control the pressure of gas from main system

⑭ Aux gas Control tank
Gas rectification

⑮ Electric dust Collector
Collecting dust by Corona method, Separate fine tar

⑯ Aux residential tank
Gas rectification

⑰ Electrocatalyst
CO and smell removal

⑱ Gas cooling tower
Cooling gas

⑲ Condensate Water Storage pit
Temporary storage tank

⑳ Condensate filter
Filtering condensate water through activated carbon, then release it to sewage, or recycle

Debris disposal, New system introduced

NHK News Ohayou Nippon
11-27-2011



New disposal system has been developed and the system will be on test run at Hirono-town, Fukushima-pref. from next month. This new system will heat-treat debris with radioactive material without oxygen state and reduce its volume into ceramic powder and ash come out from system had no radioactive material.

This system was developed by environmental equipment Mfg. in Tokyo and the system heat treat debris in furnace w/o oxygen and flame then decompose them into gas, oil and ceramic. This Mfg. said the new system reduce debris by average 1/300 and ceramic adsorbs radioactive substance so ash from the system will not contain any radioactive matters.



In according to the testing-run at Hirono-town, Fukushima-pref. last month, debris was reduced by 1/268 and the most of radioactive matter was adsorbed in ceramic. So Hirono-town has decided to install system for actual trial operation.

Other local governments who are struggled with debris showed their interests and could consider actual operation depends on how the system works at Hirono-town. Mr. Kouki Kuroda, deputy mayor told us "Reducing damped debris at temporary area is the most important issue so our expectation is high. We will have more trial operations then we want to decide for actual operation ASAP."



Ministry of the Environment: Operated selected technology of removal technologies in 2012

No. 9 Volume reduction of polluted waste by Mobile furnace of air cooling incineration

Tested by: Shinsei Technology Co., LTD.

Outline of business

Confirming volume reduction of polluted agricultural waste without flying ash at the point of waste produced by mobile furnace of air cooling incineration.

Trial agenda

1. Confirmation radioactive cesium concentrated into ash
2. Testing incineration without fry ash
3. Collecting actual data for distributed processing



Location of trial

Kawamata-town, Fukushima-pref.

Technical outline

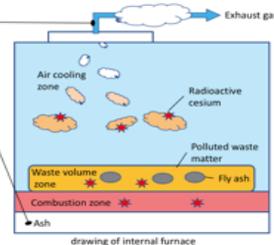
1. testing flow

Reducing volume of polluted waste by the system and confirming follows

- ① Exhaust gas
 - Measuring concentration of radioactive cesium
 - Measuring fly ash
 - Measuring temperature

- ② Ash
 - Measuring concentration of radioactive cesium

- ③ System specifications
 - Confirming rate of process
 - Confirming cost of process



2. Targets of testing

- (1) 100% Rate of cesium transfer into ash
- (2) No detected fly ash in exhaust gas
- (3) Conditions for best operation (Rate, cost)

3. Expected effects

Process of polluted waste must be done safely (radioactive cesium should be concentrated into ash not into exhaust gas) volume-reduced with low cost.

ERCM can recycle those difficult waste

Even if it is difficult process with ordinal systems, ERCM can be **directly thrown** it. Also, it is possible to throw them even if these are in the non-uniform mixed state. Moisture rate 65% or less recommended.

Vegetable waste



<High wet waste>
Food, fermentation scrap,
internal organs, shells OK

Polluted waste water



<High wet waste/smell>
Excrement, polluted dirt, ash
OK

Excrement



<High wet/Sterilization/Smell>
Excrement of chicken, cattle,
pig OK

Waste Plastic



Plastic, vinyl, Styrofoam OK
Recyclable as tar

Vermin



Vermin like deer, boar

Infectious medical waste



<Sterilization effective>
Needles, Diapers OK
Sterilized Metal come out

Primary launched projects

<< Domestic >>



15m³/day, at Kashima
Clean Center in Ibaraki



20m³/day, at Tamamiya
Foods in Nagoya

<< Overseas >>



100m³/day, at Solvi
Company in Brazil



15m³/day, at GPT
in Taiwan



100m³/day, at Dalian
in China



20m³/day, Trailer carry
Type at Dalian in China