Microwave Plasma Burner-

- method to utilize waste including dangerous agents in marine economy

Existing methods of utilizing regular dangerous public utility waste

- 1. Bulldozing on waste stockpile (about 80%)
- 2. Direct burning (about 19,5%)





3. Processing with the use of arc plasma discharge (about 0,5%)

Vices of existing utilization methods

Bulldozing waste on stockpile grounds eliminates lots of soil from use, createss difficulties for local population in everyday life, and danger of polluted water penetration into the ground and natural sources of water.



Burning waste is one of the most dangerous mathods of processing, because it leads to biosynthesis of highly toxic substances.

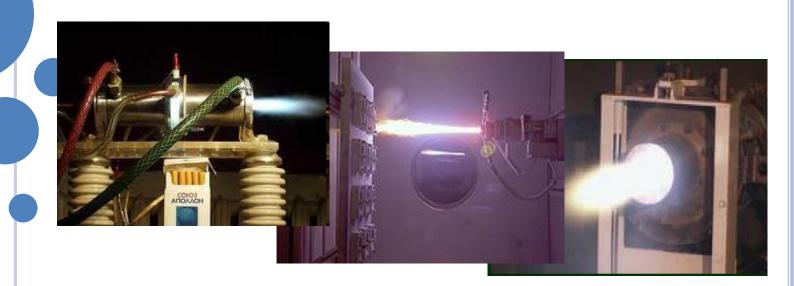
From economic point of view the method is not profitable due to its high energy consumption and eliminates recovering valuable material from the waste.



Utilization of waste with the use of arc plasma discharge has a number of disadvantages:

- substantial exploitation costs,
- low rate of efficiency because thermic effect on waste realizes beyond the zone of plasma creation.

Application of microvawe burner creating plasma eliminates all those vices.

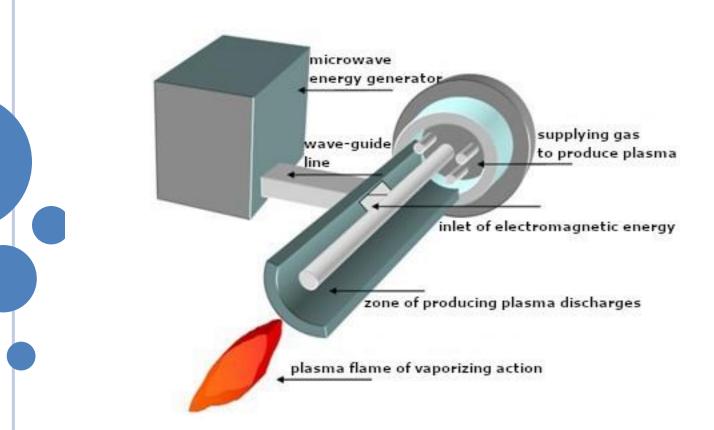


Basic differences between plasma microwave burner and arc burner

- 1. Simpler construction, absence of deficit elements and expensive metals.
- 2. Absence of electrodes allowing to substantial lowering of costs of technical servicing and hence the cost of utilization.
- 3. Due to keeping plasma in free working space the device's period of use multiplies 5-10 times.
- 4. The only element vulnerable to wear and tear and exchangable is magnetron. The period of its operation in continuous mode is about 10 000 hours while the exchange operation takes about 30 minutes.
 - Possibility of modelling plasma with the use of inactive gas stream or air which create plasma allows to deliver waste material directly to the flame which considerably enhances efficiency of thermic transformation.
 - The alternative for existing technologies is burning toxic waste in low temperatures using microwave plasma. Applying plasma at mid temperatures of 3500 5000°C allows to destroy organic and inorganic compounds with very high speeds and high rate of transformation.

Application of plasma gasification using microwave burner allows to obtain about 0,5-1 MW/h of electric-and-heat energy from a single ton of waste depending on waste morphology which is not possible with other technologies.

The proces is safe, it does not require filters and makes it possible to plant a mobile installation within city limits.



Basic advantages of planned microwave burners



- 1. Microwaves' ecological purity as a type of energy.
- 2. The device of up to 5 kW power does not require water cooling.
- 3. Protecting work safety standards for the servicing staff.
- 4. The possibility of the device operation both in natural and lower atmospheric pressure.
 - The possibility of "scaling" of the construction of plasma system in the event of microwaves' source transformation to other degree of purity and working power.
- 6. Modular workmanship of the device.

Due to versatility of plasma operation the system may be applied in many processing industry branches.



1. Installation for coal ignition in heat and power generating plants

2. Installation for utilization and neutralizing of dangerous waste and toxic chemicals – projected idea.





3. Installation for gas after-burning in waste utilization plant.



- 4. Installation to obtain polycrystalline silicon.
- 5. For utilization of regular public utility waste both organic and inorganic.
- 6. In production lines of basalt fibre, its utilization etc.

Research and analyses are made to arrive at technical-technological guidelines for the construction of the first prototype of mobile system of utilizing dangerous waste to be found in marine economy and chemical industry and widely in the sector of health protection.

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