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An Investigation into Green Influence on Materials and Mechanism of Water Cremation: Perspective Vision

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Abstract: ***Water cremation is an ecologically sustainable burial option that uses 10% of the carbon footprint and 85% less energy than flame-based cremation. Water cremation does not emit as many toxic compounds, bacteria, and gases into the atmosphere as flames cremation. It employs fewer toxic chemicals than embalming fluids required for an earthen burial. Flame-based cremation may emit up to 150 pounds of carbon dioxide into the atmosphere, which has a substantial impact on the environment. As more individuals become aware of the negative consequences of traditional funeral practices, the popularity of green funerals grows. As more states adopt this affordable and environmentally responsible alternative, water cremation will only grow in popularity. It's an especially fitting way to remember exceptional loved ones who dedicated their lives to leading sustainable lifestyles. In a green cremation, the remains of the deceased individual are preserved. These are converted to ash and can be scattered, commemorated, or kept in an urn after being placed in a cremulator. Approximately 32% more ashes are produced by water cremation than by fire cremation. While water cremation produces a consistently white powder with a finer texture, conventional cremation produces a coarse, grayish-white hue. This might be useful if your family decides to disperse your loved one's ashes for memorial mementos or ash-scattering rituals among other family members.***
Key Words: Eco-Friendly, Bio Cremation, Water, Urn, Aquamation

I. INTRODUCTION

In water cremation, a chemical called potassium hydroxide, sodium hydroxide (commonly called lye or caustic soda; both are used to manufacture soap), or a combination of the two is added to hot water. These dissolve fats and tissues into liquid. The process that uses water, alkali-based chemicals, and heat to facilitate the natural decomposition of human remains. It is also known as aquamation, flameless cremation, bio cremation, resomation, or alkaline hydrolys. This entails putting the deceased person's remains into a big steel water chamber together with a biodegradable, sealable sack. The water is heated to 160C (320F), but it cannot boil due to the pressure inside the chamber. Potassium (or sodium) hydroxide, a chemical used to create soap, is applied at a ratio of 5% chemical to 95% water. Water cremation can be completed in four to fourteen hours.

II. MATERIALS SELECTION FOR AN URN

Choosing the appropriate material for your loved one's cremation urn might be difficult. It might be difficult to choose the ideal cremation urn for your loved one. Regarding size, form, and material, there are many other possibilities to select from. Here is a quick guideline for choosing the right material for a cremation urn. Cremation urns are typically made from materials like wood, ceramic, porcelain, stone, marble, glass, or metal.

A. The Best Material for an Urn

The role of an urn determines what kind of material is ideal. A hardwood urn might not be delicate and decorative enough to be displayed, while a glass urn is not appropriate for burial. The following properties of typical urn materials are identified:

1) *Aluminum:* Aluminum is affordable, not magnetic in nature, lightweight, flexible, and resistant to corrosion.
2) *Brass:* A lightweight metal alloy that, once polished, has a brilliant gold look. Enamel or paint may be applied to brass urns, making customization simple.
3) *Ceramic:* Ceramics is best suited for household displays because it is breakable. Numerous color options are available for customization and personalization.

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4) *Crystal and Glass*: These substances are brittle. Glass and crystal urns tend to be more visually appealing since they come in a variety of hues and designs. But they cost more money.
5) *Cultured Marble*: Cultured stone is a more affordable alternative to genuine marble. It is made with a mixture of paints, stone, and resin. This substance is strong and maintains its beauty.
6) *Marble*: The marble is strong and comes in lovely hues. Although it might cost more than various urns, it is ageless.
7) *Porcelain*: Although porcelain urns are delicate, they have a beautiful appearance and many customization possibilities.
8) *Stainless Steel:* Stainless steel is affordable, long-lasting, and resistant to corrosion and scratches.
9) *Wood*: Wood is incredibly durable and can be easily personalized with lasers and etchings. Costlier than softwood urns are hardwood ones.
10) *Biodegradable Urns*: One excellent method for reducing your influence on the ecosystem is to use biodegradable urns. They are also helpful for scattering your loved one's ashes in a park or the ocean. Natural and recycled paper, wool fiber, crushed peat, coconut shells, sand, rock salt, gelatin, cornstarch, or other plant-based materials can all be used to create sustainable urns.

B. Machine

The body of the person who died is finally placed in a metal chamber filled with a solution of potassium hydroxide and water to finish the procedure. After that, it gets heated and subjected to extreme pressure. The body is broken down into chemical constituents over two to three hours.



Fig 1: Alkaline Hydrolysis Machine

The apparatus utilized for the procedure is an alkaline hydrolysis container made of stainless steel.

1) Resomation Ltd. created and patented it in 2007, calling it the Resomator Unit.
2) It is the first piece of commercial technology designed to safely disintegrate a human body.
3) The body is placed into the Resomator unit after being dressed or covered in natural fiber, such as silk or wool, and the pressure chamber is shut tightly and heated to a temperature that is sufficient for sterilization.
4) Following that, 80 gallons of water containing potassium hydroxide—a chemical often found in household liquid soap—are added to the container.
5) Approximately ninety-five percent of the mixture is water and five percent is potassium hydroxide.
6) The temperature of the water is between 300 and 350-degrees Fahrenheit, which is high enough to kill any microorganisms. The body's soft substance dissolves throughout the procedure.

III. MECHANISM

The tissues of the human body are broken down by a procedure called alkaline hydrolysis, leaving the bones, to become a powdery, pale "ash." In a bio-cremation, the deceased's body—not their coffin—is put within an oversized casket-like stainless-steel cremation container that is filled with 5 percent potassium/sodium hydroxide solution and 95 percent hot water.

In essence, the procedure accelerates and replicates the natural breakdown of a body's cells into water that happens when a person is buried. The technique relies on alkaline hydrolysis: The body is placed in a pressure vessel, which is then filled with a combination of water, and potassium hydroxide as well as heated to a temperature of around 160 degrees Celsius (320 degrees Fahrenheit), despite a higher pressure to prevent boiling. Instead, the body is essentially broken down into its chemical components, which takes between four and six hours. A lower temperature and pressure may be employed, but only for a longer period of time (98 degrees Celsius (208 degrees Fahrenheit), 14-16 hours).

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The combination is quite basic at the start of the process, with a pH of around 14. By the conclusion, the pH has dropped to 11, but the ultimate pH level is determined by the entire operation duration and the quantity of fat in the body.
The outcome is a mixture of green-brown liquid (containing amino acids, peptides, sugars, and salts) and soft, porous white bones remnants (calcium phosphate) that may be broken by hand (though a cremulator is most usually employed) to produce a white dust. The dead person's "ash" might then be returned to their next of kin. The liquid is disposed of using the sanitary sewage system or another way, such as in a garden or green space.[8] To dispose of an amount of 1,000 pounds (450 kg), roughly 60-240 US gallons (230-910 L; 50-200 imp gal) of water are needed, leading to 120-300 US gallons (450-1,140 L; 100-250 imp gal) of effluent, with a dry weight (inorganic and mineral content) of 20 pounds (9.1 kg) (approximately 2% of original weight).
Several environmental advocacy organizations have supported this alkaline hydrolysis method since it uses just 90 kWh of power, uses 25% less energy than flame-based cremation, and produces fewer pollutants and carbon dioxide. Some cremation locations in Britain are offering it as an alternative.[11] Approximately one thousand persons had selected this option for disposing of their remains in the US as of August 2007. Excluding the expenditure of capital equipment consumption, the expected running costs for the disposal of 2,000 pounds (910 kg) of remains included labor, supplies, and maintenance, totaling $116.40.

A. Impact the Cycle of Life

The skeleton pieces left behind from water cremation can be utilized to plant new life, honoring the original purpose of the process, which was to employ animal remains to nourish the Earth. After water cremation, a solution remains that is good for plants and the environment. Families might opt to utilize the remaining solution as garden fertilizer or to plant a memorial tree in their loved one's memory. How Do the Remains Appear?



Fig 2: Resomation Ashes Left / Flame Ashes Right

Relatively soft, white fragments of bone are what are left over after the operation. Unlike the coarse cremains from a flame cremation, they are ground to a pristine white ash or dust-like substance.
A harmless solution makes up the soft tissue's leftover fluids. It is made up of sugar, soap, amino acids, and peptides.

B. Benefits of a Flameless Cremation

Numerous advantages of a water cremation are identical to or comparable with those of a conventional cremation.

1) They need roughly a similar amount of time to finish.
2) They address the issue of overcrowded cemeteries and decreasing burial space.
3) hey are more environmentally friendly than burial, which involves burying tons of metal, wood, and embalming fluid each year.
4) The family can keep the ashes and use them as they see fit.

C. Much Lower Temperature

1) When the procedure is finished, the fillings separate and do not disintegrate at 300 degrees.
2) There are also metal items, such as plates, screws, and prosthetic hips, as well as plastic items, like breast implants.
3) Following the completion of the water cremation, they are likewise segregated.
4) Proponents believe that water cremation is the greenest technique available.

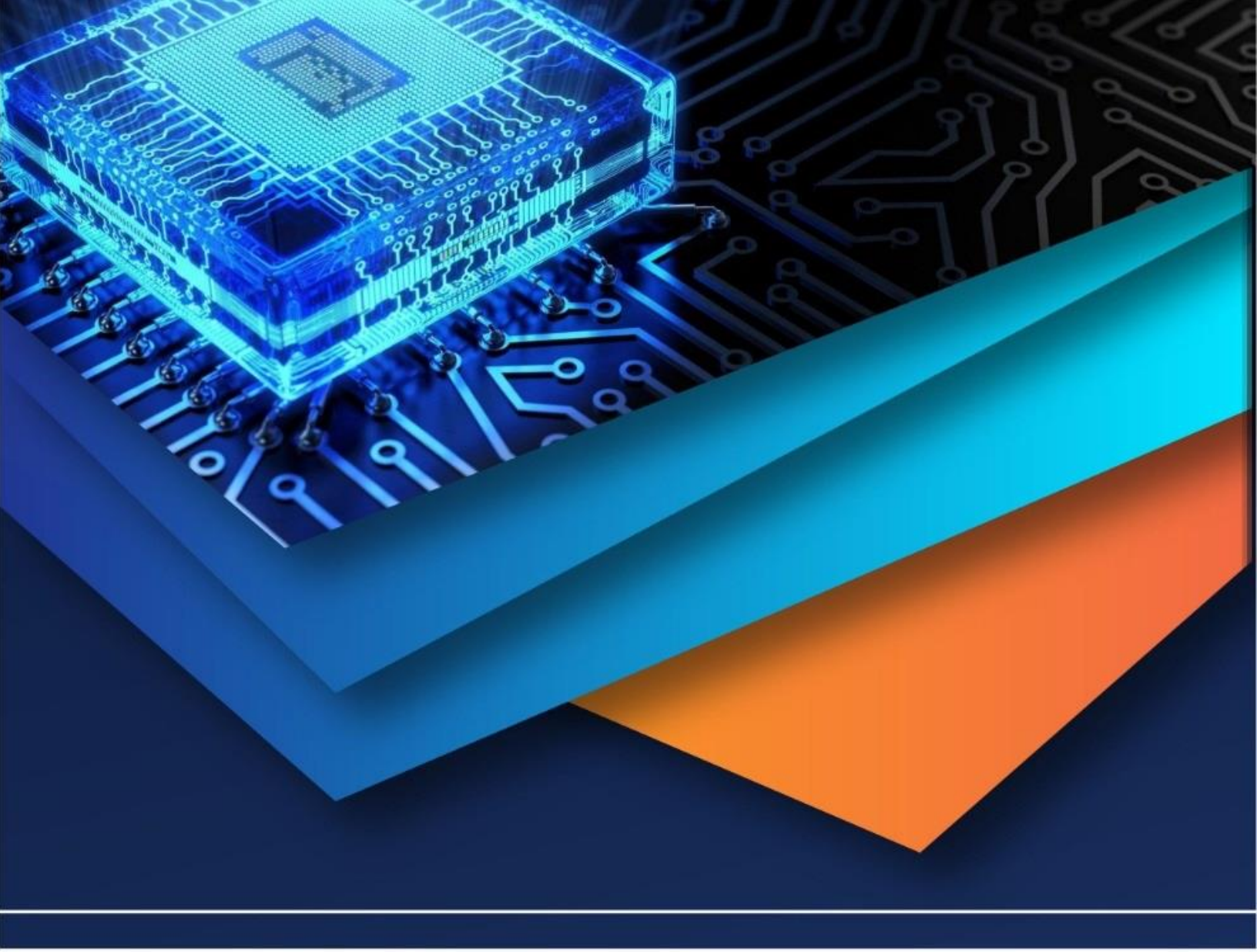
IV. CONCLUSION

Since water cremation imitates the organic decomposition process, it offers a considered substitute for traditional burial or cremation by flame. For families looking for an emotional way to remember their loved ones, this cutting-edge cremation method offers several advantages. Whichever cremation or burial choice you select, there are thoughtful and meaningful ways to honor the extraordinary life of your loved one.

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