

# **BUOYANCY-CONTROLLING WEIGHT FOR FISH-CATCHING APPARATUS OR DIVING APPARATUS USING ALUMINA AND A METHOD FOR PREPARATION THEREOF**

## **5 BACKGROUND OF THE INVENTION**

### **1. Field of the Invention**

The present invention relates to a buoyancy-controlling weight for fish catching apparatus or diving apparatus and a method for preparation thereof. More particularly, the present invention provides a buoyancy-controlling weight for fish catching apparatus or diving apparatus which could prevent the destruction of natural environment as well as aquatic ecosystem by preparing it through extracting alumina from natural mineral of soil.

### **2. Description of the Related Arts**

15       Weights are generally used in fish-catching apparatus such as fishing hook, fishing net, farming net, fish trap and diving apparatus such as self-contained underwater breathing apparatus(hereinafter "SCUBA"). These weights could be divided into fishing weight, netting weight and SCUBA weight. The fishing weight is used for buoyancy-controlling of fishing to throw a fish bait fixed into fishing hook  
20       far away or keep a fishing hook having bait at a desired underwater position by using float and the netting weight is used for catching fish or keeping the fish-raising net at a desired position. And also the SCUBA weight is used for controlling buoyancy by being attached to underwater apparatus.

Lead was conventionally used in preparing weight, because the property of

lead is soft so that it could be modified freely and manufactured easily, and it is also an advantage to have high specific gravity.

While the weight made of lead has the above described advantages, it could contaminate the water by being oxidized through corrosion when it's buried in the sea and could further destroy the ecosystem because lead is one of fatal heavy metals to damage not only fish and shellfish but also animals and plants.

That is to say, the weight is either left in the water through separation from fish-catching apparatus or diving apparatus by being caught on waterweed, stone and crack of bedrock or thrown away by the people. As time goes on, the lead weight accumulated at underwater become corroded and oxidized and finally contaminated sea, river and the like. Therefore, fish and shellfish got contaminated by lead so that it could lead birds eating fish and shellfish or people taking fish and shellfish as food to get contaminated. In addition, it causes the red tide of which the color of seawater get changed as reddish brown due to abnormal propagation of zooplankton by decreasing the amount of oxygen rapidly in the foreshore constituting water and lower part of water and such red tide kills fish and shellfish so that it could cause enormous economic loss for fish-raising fisherman.

Even though lead weight damages overall environment as well as aquatic ecosystem as described above, it is current trend that the amount of lead weight used is getting increased and most of the lead weight used are separated from fish-catching apparatus, so about 480,000 tons of lead weight per year are buried in the Korean sea. Therefore, the total amount of lead weight buried in the sea worldwide would be enormous so it is a matter of fact that the destruction of ecosystem due to lead is serious.

In addition, when handling, maintaining or repairing the fish-catching apparatus, lead weight could injure the skin and penetrate into the skin tissue so one and his posterity would undergo disorders resulted from lead poisoning.

Therefore, it's necessary to develop a new component to take place the lead  
5 in preparing weight.

Also, the contamination by heavy metal such as lead is pointed out to be a big problem not only in weight for fish-catching apparatus and diving apparatus but also in general metallic commodity such as roasting plate, so lately the commodity has been made from ceramic material of which is made by processing natural mineral of  
10 ore , which emits far infrared, to prevent the harmful influences by these heavy metals.

That is to say, it was an attempt of preparing commodity by grinding the collected natural state of ore into the appropriate mesh and casting ground ore into the desired form to solve the problem of environmental pollution and further have a good effect on the taste of cooked food as well as body through far infrared emitted from  
15 ceramic.

Therefore, it was intended to choose ceramic for the new alternative component for preparing weight, but ceramic is not appropriate for preparing heavy products such as weight because it has low specific gravity.

So, the present inventors have conducted extensive studies to provide a new  
20 ceramic having higher specific gravity for preparing weight for fish-catching apparatus or diving apparatus. As a result, it was found that it's possible to provide a new ceramic weight having appropriate specific gravity by the method comprising the steps of (a) separating and purifying alumina from soil; (b) preparing ceramic powder for processing weight by grinding alumina into appropriate size and adding colored

pigment having an affinity for fishes to the ground alumina; (c) molding ceramic weight by casting prepared ceramic powder into molding frame; (d) sintering molded ceramic weight at a heating furnace and (e) polishing the surface of sintered ceramic weight. Also, it was found that the new ceramic weight of the present invention  
5 could substitute for lead weight, so contamination of water and destruction of ecosystem due to lead could be prevented.

### **SUMMARY OF THE INVENTION**

Therefore, an object of the present invention is to provide a new  
10 environment-philic weight which could substitute for lead weight of conventional weight for fish-catching apparatus and diving apparatus.

Another object of the present invention is to provide a method for preparation of the above of described weight.

The above and other objects, features and applications of the present  
15 invention will be apparent to those ordinary skill by the following detailed description.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 shows a prospective view of an example of ceramic weight for fishing prepared by the method of the present invention.

20 Figure 2 shows a cross-sectional view of an example of ceramic weight for fishing prepared by the method of the present invention.

Figure 3 shows a prospective view of an example of ceramic weight for netting prepared by the method of the present invention

Figure 4 shows a prospective view of an example of ceramic weight for

SCUBA prepared by the method of the present invention.

<Explanation of sign used at the main part of figure>

100; weight      101; hole

102; installing hole

5

## DETAILED DESCRIPTION OF THE INVENTION

According to the present invention, the method for preparation of the weight is characterized in that which comprises the steps of (a) separating and purifying alumina by collecting soil containing more than 80% of alumina, grinding the collected soil into 80~120 mesh and supplying the ground soil with hot blast tube of a dust collector; (b) preparing ceramic powder for processing weight by grinding alumina into 320~800 mesh and adding colored pigment having an affinity for fishes to the ground alumina at the same time; (c) molding ceramic weight(100) by casting prepared ceramic powder into molding frame; (d) sintering molded ceramic weight at a temperature of 1,300~2,200°C and (e) polishing the surface of sintered ceramic weight(100).

The present invention will be described in detail hereinafter.

The advantages of the ceramic weight prepared by the present invention are as follows: First, it does not contaminate the water and could preserve the aquatic ecosystem and prevent the destruction of secondary ecosystem resulted from food chain even when it's left in the water through separation from fish-catching apparatus or diving apparatus; Second, this weight doesn't contaminate the water so that there is no need to remove the weight and it is possible to prevent the loss of labor occurred in the conventional weight's collection; Third, it is helpful of fish and shellfish to grow

up and it acts as catalyst of reviving aquatic ecosystem by breaking down water molecule into small water molecule because the far infrared is emitted from ceramic weight; Fourth, it's physical property is hard enough to be hardly separated from fish-catching apparatus and diving apparatus through tide so that the loss of labor for maintaining and repairing could be reduced; Fifth, it is possible to prepare the size of weight as large as corresponding size of lead weight because it's made of alumina which is prepared by separating from natural mineral of soil and purifying it so the specific gravity almost as same as lead and Sixth, it is a environment-philic weight which could substitute for lead weight because it could solve the problems of injuring the skin by lead while maintaining and repairing of fish-catching apparatus or diving apparatus, or one and his posterity undergoing disorders resulted from lead poisoning.

A method for preparation of the weight of the present invention will be described in detail hereinafter.

The step (a) is to separate and purify alumina by collecting soil containing more than 80% of alumina, grinding the collected soil into 80~120 mesh and supplying the ground soil with hot blast tube of a dust collector.

To prepare the weight for fish-catching apparatus or diving apparatus, soil containing more than 80% of alumina has primarily be collected selectively and grinds the collected soil into 80~120 mesh with grinder. It is to transfer soil effectively by hot wind pressure and to separate alumina by the difference of specific gravity when it is injected into dust collector of the step (b).

Even though the soil used in the present invention is collected from Seohwang-ri, Hadong-gun, Kyungsangnam-do, Republic of Korea, any soil, which contains more than 80% of alumina, could be used regardless of the collecting place.

To remove the moisture contained in the ground soil, it is injected into dust collector which is supplied with hot wind. When soil being injected into the hot wind tube is transferred through spraying by hot wind pressure, alumina having high specific gravity is fallen down on lots of dust collecting hopper being equipped parallel with lower part of hot wind tube and other materials having lower specific gravity is emitted from outlet of hot wind tube so that only alumina is separated and purified.

And the above dust collector works on the same principle as the dust collector commonly used in the art.

10 The step (b) is to prepare ceramic powder for processing weight by grinding separated alumina into 320~800 mesh and adding colored pigment having an affinity for fishes to the ground alumina at the same time.

The ceramic powder is prepared by grinding the separated alumina of the step (a) into 320-800 mesh, which is appropriate for molding the weight and could minimize the moisture-containing rate of air in the atmosphere and adding colored pigment having affinity for fishes.

The colored pigment having affinity for fishes may be used according to the type of fishes, and the specific example of which is black pigment, blue pigment and the like.

20 The step (c) is to mold ceramic weight(100) by casting prepared ceramic powder into molding frame.

To mold the ceramic weight, the ceramic powder is casted into molding frame according to use of weight such as fishing weight, netting weight, SCUBA weight and the like so that the weight could have shape and specific gravity for the

specific use. That is to say, fishing weight and netting weight should have the hole formed to get installed on each fish-catching apparatus and SCUBA weight should have the installing hole formed to roll up the belt of diving apparatus, so each weight has to be molded in the right molding frame individually.

5           The step (d) is to sinter molded ceramic weight at a temperature of 1,300~2,200°C.

          The molded ceramic weight is to be sintered after being transferred at an electric furnace installed on basement in order to reduce the rate of the inferior goods and economize on fuel by minimizing the temperature change due to temperature  
10   change of atmosphere through transferring means such as conveyor belt.

          It is desirable to install the electric furnace about 24cm below from the surface of the earth.

          It is preferable to heat ceramic weight at a temperature of 1,300~2,200°C for reducing volume and increasing strength by oxidizing the metal component  
15   contained in the ceramic weight and condensing it at the same time.

          The step (e) is to polish the surface of sintered ceramic weight(100).

          To prepare the ceramic weight, the surface of ceramic weight is polished to remove the sludge after taking out the sintered ceramic weight to cool down.

          The ceramic weight prepared by the above described method has appropriate  
20   shape and specific gravity according to their use, so in case of fishing weight, it is properly inflated in a length direction of outer surface and has a perforated shape of which connecting hooks for connecting weight with fishing line or hole(101) for fishing line being putting in are through in a length direction(See Fig. 1).

          Also, in case of netting weight, it is cylindrical and has a perforated shape of

which hole (101) for weight being installed on the net is through in a length direction(See Fig. 2).

And in case of SCUBA weight, it is quadrilateral type having fixed depth and has an installing hole(102) at the center of weight for rolling up belt(See Fig. 3).

5           A method of using ceramic weight prepared by the method of the present invention will be described hereinafter by taking an example of fishing weight in Fig. 1.

After installing the connecting hooks on formed hole(101) in ceramic weight(100) where connecting hooks are positions on either side of the weight,  
10   connect one of connecting hook with line connected with fishing rod and connect the other connecting hook with line connected with fishing hook and do fishing.

Also, in case of a float fishing, after connecting formed hole, which is appropriate for a float fishing, with fishing line connected with fishing rod, connect connecting hook connected with fishing hook with end of fishing line and do fishing.

15           As described above, the ceramic weight of the present invention is a environment-philic weight which could substitute for conventional lead weight for fish-catching apparatus or diving apparatus so it does not contaminate the water and could preserve the aquatic ecosystem and prevent the destruction of secondary ecosystem resulted from food chain even when it's left in the water through separation  
20   from fish-catching apparatus or diving apparatus because it is composed of natural mineral of oil; this weight doesn't contaminate the water so that there is no need to remove the weight and it is possible to prevent the loss of labor occurred in the conventional weight's collection; it is helpful of fish and shellfish to grow up and it acts as catalyst of reviving aquatic ecosystem by breaking down water molecule into

small water molecule because the far infrared is emitted from ceramic weight; it's physical property is hard enough to be hardly separated from fish-catching apparatus and diving apparatus through tide so that the loss of labor for maintaining and repairing could be reduced; it is possible to prepare the size of weight as large as  
5 corresponding size of lead because it's made of alumina which is prepared by separating from natural mineral of soil and purifying it so the specific gravity almost as same as lead; and it is a environment-philic weight which could substitute for lead weight because it could solve the problems of injuring the skin by lead poisoning while maintaining and repairing of fish-catching apparatus or diving apparatus, or one  
10 and his posterity undergoing disorders resulted from lead poisoning.

In addition, the weight of the present invention is molded according to it's use, so it is easy to install and could be installed on fish-catching apparatus or diving apparatus firmly.

It is understood that the foregoing detailed description is given merely by  
15 way of illustration and that modifications and variations may be therein without departing from the spirit and scope of the invention.

**CLAIMS**

1. A method for preparation of weight for fish-catching apparatus or diving apparatus comprising the steps of
  - (a) separating and purifying alumina by collecting soil containing more than 80% of alumina, grinding the collected soil into 80~120 mesh and supplying the ground soil with hot blast tube of a dust collector;
  - (b) preparing ceramic powder for processing weight by grinding separated alumina into 320~800 mesh and adding colored pigment having an affinity for fishes to the ground alumina at the same time;
  - 10 (c) molding ceramic weight(100) by casting prepared ceramic powder into molding frame;
  - (d) sintering molded ceramic weight at a temperature of 1,300~2,200°C and
  - (e) polishing the surface of sintered ceramic weight(100).
- 15 2. Weight for fish-catching apparatus or diving apparatus prepared by the method of claim 1.
3. Weight according to claim 2, where said weight for fish-catching apparatus is a fishing weight, it is inflated in a length direction of outer surface and has a  
20 perforated shape of which connecting ring for connecting weight with fishing line or hole(101) for fishing line being putting in are through in a length direction.
4. Weight according to claim 2, where said weight for fish-catching apparatus is a netting weight, it is cylindrical and has a perforated shape of which hole (101) for



weight being installed on the net is through in a length direction.

5. Weight according to claim 2, where said weight for diving apparatus is a SCUBA(self-contained under-water breathing apparatus) weight, it is a rectangular parallelepiped and has an installing hole(102) at the center of weight for rolling up belt.

10

15



20

25