UNITED STATES PATENT AND TRADEMARK OFFICE

Utility Patent Application (Provisional)

TITLE: CHEMICAL REACTION BASED BUOYANCY CONTROL SYSTEM FOR DEEP SEA VEHICLES

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FIELD OF THE INVENTION

[0001] The present invention relates to the field of deep-sea vehicles and their buoyancy control mechanisms. More specifically, it pertains to an innovative system that employs chemical reactions for buoyancy control, minimizing environmental impact and allowing efficient operation at extreme depths.

BACKGROUND OF THE INVENTION

[0002] The deep-sea vehicles are used in various applications such as marine research, undersea salvage, oil and gas exploration, and oceanographic studies. Operating these vehicles at great depths presents unique challenges, one of which is maintaining appropriate buoyancy.

[0003] Traditional solutions include systems that use oil-filled ballast tanks and weights. The vehicle descends as the weight pulls it down, and the weight is released when it's time for the vehicle to ascend. However, this approach leaves weights and other debris in the ocean, contributing to marine pollution.

[0004] Therefore, there is a continuous need for an environmentally-friendly, efficient, and versatile buoyancy control system for deep-sea vehicles capable of operating at extreme depths without leaving debris in the ocean.

SUMMARY OF THE INVENTION

[0005] The present invention introduces a novel buoyancy control system that uses a chemical transformation process involving solid reactant X and liquid reactant Y. This system reduces environmental impact and allows the vehicle to operate at any depth, up to 12,000 meters.

DETAILED DESCRIPTION OF THE INVENTION

[0006] The proposed system comprises a ballast tank, a storage tank, an overpressure tank, solid reactant X, and liquid reactant Y. The ballast tank is filled with a highly saturated mixture of solid reactant X and water, while the storage tank is filled with liquid reactant Y.

[0007] The vehicle descends using a weight. When it needs to surface, liquid reactant Y is pumped into the ballast tank. The interaction between reactants X and Y triggers a chemical transformation, resulting in a liquid solution with a lower density than the original reactants.

[0008] The formation of this low-density solution increases the buoyancy of the vehicle, enabling it to surface. As the vehicle ascends, the pressure in the ballast tank rises and is released through an environment-relative overpressure valve.

[0009] This valve empties into an expandable overpressure tank containing the chemical ballast, preventing direct discharge into the marine environment. Once the vehicle has surfaced, the system can be cleaned and reset for reuse.

[0010] Unlike conventional systems, this invention leaves no weights or debris in the ocean, thereby minimizing environmental impact. Furthermore, it is capable of operating at any depth, up to 12,000 meters of water.

CLAIMS

1. A buoyancy control system for deep-sea vehicles, comprising:
- a ballast tank containing a highly saturated mixture of solid reactant X and water;
- a storage tank containing liquid reactant Y;
- an overpressure tank for containing the resulting chemical ballast;
- a valve system to control the flow of reactants and release of pressure.

2. The system of claim 1, wherein the liquid reactant Y is pumped into the ballast tank to induce a chemical transformation, resulting in a liquid solution of lower density than both reactants X and Y.

3. The system of claim 1, further comprising an environment-relative overpressure valve that releases the increasing pressure into an expandable overpressure tank.

4. The system of claim

3, wherein the overpressure tank is used to contain the chemical ballast, thereby preventing direct discharge into the marine environment.

5. The system of claim 1, capable of operating at any depth, up to 12,000 meters of water.

6. The system of claim 1, wherein the system can be cleaned and reset for reuse after surfacing.

7. The system of claim 1, which minimizes the environmental impact by leaving no weights or debris in the ocean.

PUBLICATION NOTE:

This patent is still a work and progress and so to retain key aspects private chemical names and diagrams have been redacted and replaced with reactant x and reactant y for the time being.