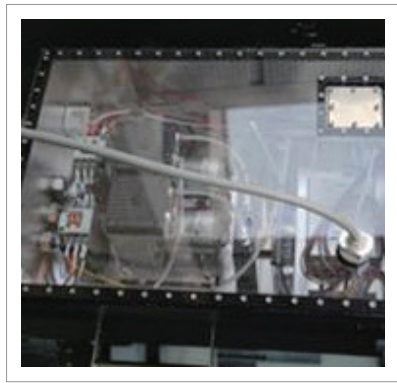


Underwater Breathing Apparatus Using Dissolved Oxygens

Dr. Pil Woo Heo
Department of Thermal Systems
T. +82 – 42 – 868 – 7331
E. pwheo@kimm.re.kr



⇒ Technology for an apparatus using dissolved oxygens for underwater breathing without an oxygen tank for a long time

Client / Market

- Underwater disaster rescue equipment, underwater exploration equipment, scuba diving equipment, submerged scooter, underwater activity equipment, the platform for supplying underwater oxygens

Necessity of this Technology

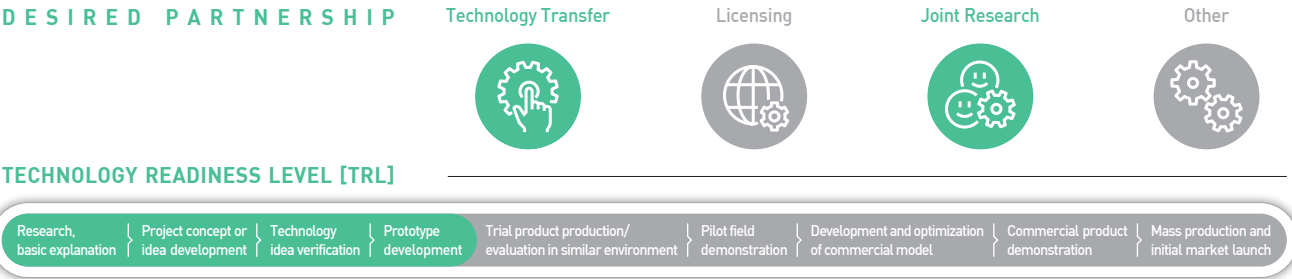
- When using an oxygen tank, underwater activities are allowed only within the time limited by the oxygen tank capacity.
- Long-hour underwater activities such as underwater rescue activities for an emergency marine disaster or underwater explorations require multiple oxygen tanks, which leads to make many limitations due to its volume and weight.

Technical Differentiation

- This technology does not require an oxygen tank, enables underwater breathing using dissolved oxygen in water
- When developed as a small portable design, it is expected to be utilized in various areas such as human rescue, transportation means, disaster prevention, aquanautics, leisure activities, and military activities in water.
- By minimizing the energy consumption, oxygens can be supplied from water for long hours.
- Underwater breathing apparatus technology using dissolved oxygen in water without an oxygen tank
- This technology reduces power consumption by increasing surface area
- Continuous treatment of gases emitted from breathing for reuse
- Improving dissolved oxygen separation rate using magnetic materials
- Underwater breathing with an oxygen tank limits underwater activity time due to its tank capacity; using dissolved oxygen in water enables long-hour underwater activities

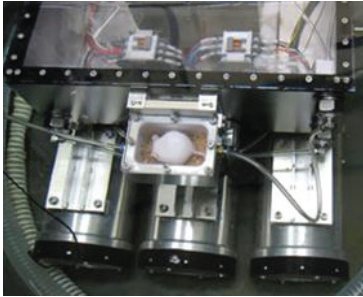
Excellence of Technology

- Lab mic subjected to an experiment using 500 mL/min dissolved oxygen separation technology survived for 50 minutes underwater



- As an academic presentation, published on J. of Membrane Science, Sensors and Actuators A: Physical etc.
- Development of artificial gill technology for underwater breathing without an oxygen tank (Electronic Times, Dec. 11, 2011) reported
- 2 principal researchers and 2 senior researchers were participated in the research.

Underwater Breathing Apparatus Using Dissolved Oxygens



Current Intellectual Property Right Status

PATENT

- Air Separation Type of Respiration Submarine Mask (KR1144619, PCT/KR2010/008865)
- Apparatus for Breathing Using Hollow Fiber (KR1044390)
- Apparatus of Separating and Collecting Dissolved Gases (KR1055315)
- Device for Measuring Water Quality Using Hollow Fiber and Method Using the Same (KR1026991)
- Apparatus for Underwater Breathing Using Radially Positioned Hollow Fiber (KR1051020)
- Snorkel Using Hollow Fiber (KR1076701)
- Rebreather Using Hollow Fiber Membrane with Buffer (KR1078280)
- Dissolved Gas Distributing Type of Breathing Apparatus Using Hollow Fiber (KR1094939)
- Pressurizing Rebreather Using Hollow Fiber Membrane (KR1131195)
- Oxygen Controlling-type Breathing Apparatus Using Hollow Fiber (KR1408176)
- Underwater Propulsion Apparatus Using Hollow Fiber (KR1328615)
- Circulation Type of Respiratory Apparatus Using Hollow Fiber (KR1346757)
- Hollow Fiber Membrane Module (KR1387949)
- Respiratory Apparatus with Increased Separating Capacity Using Hollow Fiber (KR2014-0073455)
- Rotary Type of Respiratory Apparatus Using Hollow Fiber (KR2014-0083168)
- Two-way Injection Type of Hollow Fiber Membrane Module (KR2014-0117495)