

선박평형수 관리시스템을 위한 해수 살균법
Sterilization of Seawater for the Ballast Water Management System

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ABSTRACT : The International Maritime Organization(IMO) adopted the International Convention for the Control and Management of Ships' Ballast Water and Sediments in 2004 to prevent the transfer of aquatic organisms via ballast water. Forty ballast water treatment systems were granted final approval. A variety of techniques have been developed for ballast water treatment including UV treatment, indirect or direct electrolysis, ozone treatment, chemical compounds and plasma-arc method[1]. In particular, using plasma and ozone nano-bubble treatments have been attracted in the fields. However, these treatment systems have a problem such as remained toxic substance, demand for high power source, low efficiency, ets. In this paper, we present our strilization results obtained from membrane type electrolytic-reduction treatment system

The core of an electrolysis unit is an electrochemical cell, which is filled with pure water and has two electrodes connected with an external power supply. At a certain voltage, which is called critical voltage, between both electrodes, the electrodes start to produce hydrogen gas at the negatively biased electrode and oxygen gas at the positively biased electrode. The amount of gases produced per unit time is directly related to the current that passes through the electrochemical cell.

From the results, we could confirm the sterilization effect of bacteria such as S. aureus, E. Coli and demonstrate the mechanism of sterilization phenomena by electrolytic-reduction treatment system.

References

[1] E.C. Kim, J.H. Oh and S.G. Lee, Journal of the Korean Society for Marine Environmental Engineering, Vol. 15, No. 3 (2012) 219-226.