特　許　証
(CERTIFICATE OF PATENT)

特許第７７１７３１３号
(PATENT NUMBER)

発明の名称
(TITLE OF THE INVENTION)　ペルオキシダーゼの化学発光検出・定量・活性測定法

特許権者
(PATENTEE)　京都府相楽郡精華町光台１丁目７　けいはんなプラザラボ棟４Ｆ

一般社団法人京都光科学研究所

発明者
(INVENTOR)　**柄谷　肇**

出願番号
(APPLICATION NUMBER)　特願２０２２－０８１１６４

出願日
(FILING DATE)　令和　４年　４月２５日 (April 25,2022)

登録日
(REGISTRATION DATE)　令和　７年　７月２５日 (July 25,2025)

この発明は、特許するものと確定し、特許原簿に登録されたことを証する。

(THIS IS TO CERTIFY THAT THE PATENT IS REGISTERED ON THE REGISTER OF THE JAPAN PATENT OFFICE.)

令和　７年　７月２５日 (July 25,2025)

特 許 庁 長 官
(COMMISSIONER, JAPAN PATENT OFFICE)

河西康之

United States of America

To Promote the Progress of Science and Useful Arts

The Director

of the United States Patent and Trademark Office has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this United States

Patent

grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

Katherine Kelly Vidal

Director of the United States Patent and Trademark Office

US011879148B2

(12) **United States Patent**
Karatani

(10) **Patent No.: US 11,879,148 B2**
(45) **Date of Patent: Jan. 23, 2024**

(54) **METHODS FOR DETECTION, DETERMINATION, AND ACTIVITY MEASUREMENT OF PEROXIDASE BASED ON CHEMILUMINESCENCE**

(71) Applicant: **KYOTO LUMINOUS SCIENCE LABORATORY**, Kyoto (JP)

(72) Inventor: **Hajime Karatani**, Kyoto (JP)

(73) Assignee: **KYOTO LUMINOUS SCIENCE LABORATORY**, Kyoto (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **17/733,531**

(22) Filed: **Apr. 29, 2022**

(65) **Prior Publication Data**

US 2022/0348980 A1 Nov. 3, 2022

(30) **Foreign Application Priority Data**

Apr. 30, 2021 (JP) 2021-99761

(51) **Int. Cl.**
C12Q 1/28 (2006.01)

(52) **U.S. Cl.**
CPC ***C12Q 1/28*** (2013.01)

(58) **Field of Classification Search**
CPC C12Q 1/28
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,432,662 B1 8/2002 Davis et al.

FOREIGN PATENT DOCUMENTS

JP 2011-043447 A 3/2011

OTHER PUBLICATIONS

Collaudin et al., "Investigations of the Enhancer Effect of a High-Salt Concentration Medium on the Luminol Chemiluminescent Reaction", Photochemistry and Photobiology, 1997, vol. 65, No. 2, pp. 303-308. (Year: 1997).*
Banu et al., "Luminol chemiluminescence induced by immobilized xanthine oxidase", Analytica Chimica Acta, 2005, vol. 541, pp. 91-97. (Year: 2005).*
Karatani., "Luminol-hydrogen peroxide-horseradish peroxidase chemiluminescence intensification by kosmotrope ammonium sulfate", Analytical Sciences, 2022, vol. 38, pp. 613-621. (Year: 2022).*

* cited by examiner

Primary Examiner — Satyendra K Singh
(74) *Attorney, Agent, or Firm* — Sughrue Mion, PLLC

(57) **ABSTRACT**

A further high-sensitive method for detection, determination, and activity measurement of peroxidase with no special enhancer argent. The substance, for example, high-concentration ammonium sulfate, is dissolved in the reaction solution to give rise to the micro-hydrophobic property, for detection, determination, and activity measurement of peroxidase using luminol and hydrogen peroxide as substrates.

3 Claims, 11 Drawing Sheets