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**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 for the term set forth below, subject to the payment of maintenance fees as provided by law.

If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.

If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the U.S. filing date, subject to any statutory extension. If the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121 or 365(c), the term of the patent is twenty years from the date on which the earliest application was filed, subject to any statutory extensions.

Jon W. I. Dudas

Director of the United States Patent and Trademark Office



(12) **United States Patent**
Tanaka et al.

(10) **Patent No.:** US 7,175,877 B2
(45) **Date of Patent:** Feb. 13, 2007

(54) **FILM, OPTICAL MEMORY MATERIAL WITH THE FILM, AND METHOD FOR PRODUCING THE FILM**

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(73) **Assignee:** Riken, Saitama (JP)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 44 days.

(21) **Appl. No.:** 10/808,517

(22) **Filed:** Mar. 25, 2004

(65) **Prior Publication Data**

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(30) **Foreign Application Priority Data**

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(51) **Int. Cl.**
B05B 5/00 (2006.01)

(52) **U.S. Cl.** 427/157; 264/21; 427/425;
428/690

(58) **Field of Classification Search** None
See application file for complete search history.

(56) **References Cited**

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Dvornikov, et al., "Materials and Systems for Two Photon 3-D ROM Devices", Jun. 1997, IEEE Transactions on Components, Packaging, and Manufacturing Technology, Part A, vol. 20, No. 2, pp. 203-212.*

Tanaka, et al., "Rhodamine-B-doped and Au(III)-doped PMMA film for three-dimensional multilayered optical memory", Oct. 2002, Optics Communications, ol. 212, Issues 1-3, pp. 45-50.*

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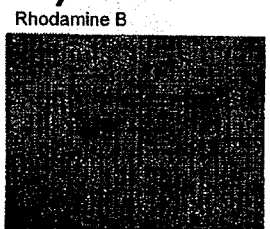
(57) **ABSTRACT**

Disclosed is a film comprising PMMA and a fluorescent substance having a xanthene skeleton and a lactone ring and/or a fluorescent substance having a xanthene skeleton and a group —COOR, where R represents a hydrogen atom or a substituent, capable of forming an intramolecular lactone ring, said fluorescent substances being dispersed in the PMMA. The film is useful as an optical memory.

8 Claims, 12 Drawing Sheets

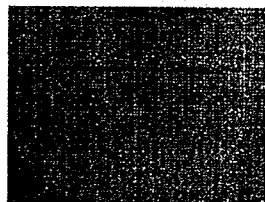


Rhodamine 6G



Rhodamine B

after 6 minutes



after 1 hour

特許登録通知連絡書

平成 19 年 9 月 25 日

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この度、下記の特許・実用新案登録出願が登録となりましたので、特許・実用新案登録証（写）を送付いたします。

なお、登録になると登録補償金（特許 2 万円、実案 1 万 5 千円）が支払われます。

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名称 フィルム、フィルムを用いた光メモリ材料、および、フィルムの製造方法

要約 【課題】 PMMA中に蛍光物質が分散したフィルム、当該フィルムを用いた光メモリ材料、当該光メモリ材料を用いた3次元メモリを開示する。

（添付書類）

特許・実用新案登録証（写）

特許公報