

## 附件四、技術說明表



### 一種具可再製造、自修復及可持續之新型量子點複合材料

**提案人：** 梁文傑 教授

**單位：** 國立臺灣大學 化學系/研究所

**簡歷：**

國立台灣大學 化學系 教授 1994年 ~

香港中文大學化學系 講師 1993年 ~ 1994年

#### 市場及需求：

根據目前國內之量子點膜材料，為使用三明治法在兩層塑膠膜中間放入量子點材料，此法在後續材料老化後的回收難度高(分離難度高)，因此大多做為單次使用，而本技術將提供可直接做成量子點薄膜的複合材料，在生產瑕疵品處理或老化材料回收方面，可直接將其收集並重新熱壓成型。

#### 技術摘要(含成果)：

本發明提供一種混摻量子點之類玻璃體聚合物(Vitrimer)，此複合材料具有良好的可重塑性以及自修復性質，在高溫重塑後仍維持良好的發光效果，且在經由元件的表現成果顯示出優於商用品的發光效率。

#### 優勢：

目前市售的量子點膜成品，大多為單次使用的模式，即老化後不太可能回收再造，因此在後續廢棄物處理及回收效率皆不慎理想，而本技術提供之量子點複合材料，其結合了新型塑膠材料(類玻璃體聚合物-Vitrimer)的特性，可直接製造出穩定性高之量子點膜，使其在瑕疵品及老化產品的回收具有高潛力。

#### 競爭產品：

目前已市售之量子點商品

#### 專利現況：

TWI643934B (量子點膜, 2018)

CN115175972A (量子點膜, 2020)

TWI766779B (量子點複合材、應用其的光學膜及背光模組, 2022)

#### 聯絡方式(請不用填)：

臺大產學合作總中心

Tel: 02-3366-9945, E-mail: ordiac@ntu.edu.tw



## A Novel Reprocessable, Self-healable and Sustainable Luminescent Quantum Dots Composites

**PI :** Prof. Man-kit Leung

Department of chemistry, National Taiwan University.

### **Experience:**

National Taiwan University, Professor 1994 ~  
department of chemistry,

The Chinese University of Hong Kong, Lecturer 1993 ~ 1994  
Kong, department of chemistry

### **Market Needs:**

According to the current domestic quantum dot film materials, the sandwich method is the most common way for the insertion of quantum dot materials between two layers of plastic films. This method is difficult to recycle and/or separate the waste aging materials, therefore, most of them are disposable. Herein, this invention will provide a novel composite material that can be directly made into a quantum dot film without complicate procedures. Moreover, the defective products and aging materials can be directly collected and reprocessed for next use.

### **Our Technology:**

The invention provides a vitreous polymer (Vitrimer) mixed with quantum dots. This composite material has good remodelability and self-healing properties, and maintains a good luminous effect after remodeling at high temperature. The results also shows good luminous efficiency relative to commercial products.

### **Strength:**

Most of the quantum dot films in the market are disposable which are unlikely to be recycled when aging. That is, the subsequent waste treatment and recycling efficiency are not ideal. However, the quantum dot composite material invented by our group combined the new plastic materials (Vitrimer) and quantum dot to directly produce highly stable quantum dot film, making them have high potential in the recycling of defective and aging products.

### **Competing Products:**

The industry has traditional methods for making Quantum-dot films..

### **Intellectual Properties:**

TWI643934B (Quantum dot film, 2018)

CN115175972A (Quantum dot film, 2020)

TWI766779B (Quantum dots composite material, optical film and backlight module using the same, 2022)

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**Contact (do not need to fill out):**

Center for Industry-Academia Collaboration, NTU

Tel: 02-3366-9945, E-mail: ordiac@ntu.edu.tw



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