

## عنوان مقاله:

Fabrication of Titania Nanotubes-Graphene Hybrid for Using in Photothermal Therapy of Breast Cancer

## محل انتشار:

سومین جشنواره ملی و کنگره بین المللی علوم و فناوری های سلول های بنیادی و پزشکی بازساختی (سال: 1397)

تعداد صفحات اصل مقاله: 1

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## خلاصه مقاله:

Background and Aim: Breast cancer is a serious health concern for women. There are several ways for the treatment of breast cancer. Nevertheless, the lack of selectivity in these methods leads to undesirable adverse effects. Photothermal therapy is a noninvasive cancer therapy technique in which tumor tissues are exposed to light and received light is converted to heat to promote tumor destruction. Photothermal therapy contains raising the temperature of tumor cells to the range of 42-46°C, leading to cell death. The aim of this study is the fabrication of TiO<sub>2</sub> nanotubes-graphene hybrid for using in photothermal therapy. Methods: TiO<sub>2</sub> NTs layer was formed by electrochemical anodization of Ti thin foils. Then the anodized samples were sonicated in ethanol for 5 h to separate the TiO<sub>2</sub> nanotubes from the substrates. The TiO<sub>2</sub> nanotubes-graphene hybrid was made as follows: The GO was dispersed in ethanol by ultrasonic treatment for 30 min. Subsequently, this suspension was mixed with the TiO<sub>2</sub> solution and the mixture was stirred for another 20 min. The reduced form of the GO, as well as the TiO<sub>2</sub> nanotubes attachment, was obtained by UV irradiation for 3 h. Meanwhile, the UV irradiation led to photoreduction of the GO to the graphene (rGO) and the suspension color changed from gray to black. Results: In order to TiO<sub>2</sub> nanotubes formation the electrochemical anodizing process was performed. The SEM image of the anodized substrate showed that the TiO<sub>2</sub> nanotubes were orderly formed throughout the substrate. The estimated inner diameter of nanotubes is 90 nm and the outer diameter of nanotubes is 160 nm. The XRD pattern of TNTs-graphene hybrid showed that the photocatalytic reduction of graphene oxide occurred by ultraviolet irradiation. Also, there is no graphene oxide peak in this pattern, which indicates that all of the graphene oxides have been reduced and converted into the graphene (rGO). The graphene (rGO) sheets can be observed in the SEM image of TNTs-graphene hybrid. Moreover, it can be seen that TiO<sub>2</sub> nanotubes were distributed on the graphene sheets. Conclusion: In this research, we investigated the fabrication of TiO<sub>2</sub>-graphene hybrid, which could be used for photothermal therapy of breast cancer. At first, the TiO<sub>2</sub> nanotubes were formed by electrochemical anodizing process and results showed that the TiO<sub>2</sub> nanotubes were completely formed on the Ti substrate. Then the hybrid of TiO<sub>2</sub> nanotubes and graphene was synthesized. The photoreduction of graphene oxide was completely occurred by UV radiation and the TNTs-graphene hybrid was obtained.

## کلمات کلیدی:

Photothermal therapy; Breast cancer; Titania nanotubes

لینک ثابت مقاله در پایگاه سیویلیکا:

