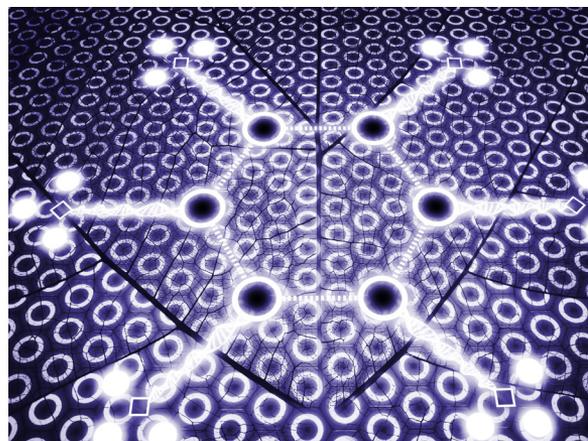


Abstract

Smart polymeric materials for controlled drug release applications. A smart hydrogel to be used in controlled release applications in pharmaceutical industry and an effective way of synthesizing these materials as well.

Polymeric hydrogels are one of the most commonly used polymers for controlled release applications since they are biocompatible, pH responsive and able to retain water. Hydrogels to be used in controlled release applications have to be uniform in structure with enhanced swelling properties, they have to be biocompatible and they have to preserve gel integrity whole time.

With this technology presented herein, a pH responsive polymeric hydrogel with enhanced properties is developed. Furthermore an efficient way of synthesizing these polymers is also reported.

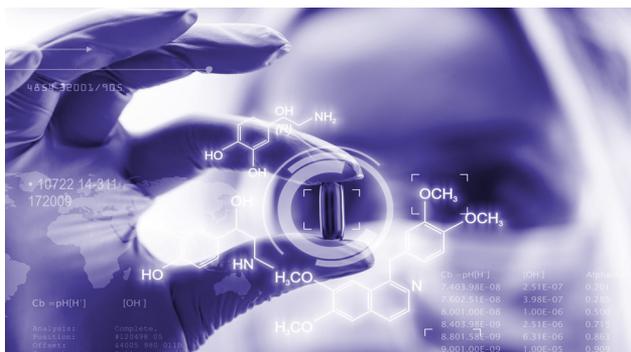


Problem solved with the technology

Controlled and site-specific delivery of pharmaceuticals is a widely used method in pharmaceutical industry in recent years and drug delivery is achieved by smart polymers. Currently used materials still needs to be improved since it is quite challenging to match patients' needs at proper times and proper sites of the body. Smart materials in other words stimuli responsive materials are commonly employed as controlled release agents. They give response to environmental changes such as pH and temperature so that they exhibit desirable physicochemical properties depending on their collapsed or swollen states enabling the regulation of the drug release.

This technology is related to two different smart hydrogel materials to be used in drug delivery applications. The hydrogels are namely P(MAA-g-EG) derivatives which are widely used polymers for controlled release applications. These polymers offered in this technology are synthesized via a novel method and the resulting products turned out to have enhanced properties such as enhanced swelling properties thus more effective uptake/release of the active material.

The synthesis method is also advantageous over the ones that are already known since visible light is used to initiate photopolymerization instead of UV light which makes the end product less toxic thus more biocompatible. With this method used herein also lesser amount of photo-initiator is employed resulting a less toxic end product. The method is also more feasible since the reaction times are much shorter than the already known methods of synthesis.



Potential Application

These smart materials are designed to be used in Pharmaceutical Industry for controlled drug delivery.

Several smart advanced materials that are used in drug delivery applications in pharmaceutical industry is offered with this invention. An effective way of synthesizing these materials is also proposed. Said smart materials are pH responsive hydrogels with improved biocompatibility, uniformity in structure for better performance, enhanced swelling properties and gel integrity at both collapsed and swollen states.

Customer Benefits

- Enhanced efficacy
- Reduced risk profile
- Increased convenience and compliance
- Enhanced swelling properties and gel integrity at both collapsed and swollen states.

Market Trends

The drug-delivery market is vast, and provides drug companies with an abundance of routes for administration of their drug. The exact size of the market is near impossible to define, due to the breadth, complexity and secondary role the drug-delivery mechanism usually takes. Healthcare companies focuses on ameliorated drug-delivery methods to increase efficacy of a therapy, rather than the mechanism of action of the actual drug. The market is expected to widen, as new routes of administration are explored and increasing partnerships are formed. The global advanced drug delivery market should grow from roughly \$178.8 billion in 2015 to nearly \$227.3 billion by 2020, with a compound annual growth rate (CAGR) of 4.9%.



Additional Technical Information

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