Smart polymeric materials for controlled drug release applications

Abstract
This technology presented herein offers an advanced pH responsive smart hydrogel to be used in controlled release applications in pharmaceutical industry and an effective way of synthesizing these materials as well. Said hydrogels have improved biocompatibility, uniformity in structure for better performance, enhanced swelling properties and gel integrity at both collapsed and swollen states.

Technical Overview
Controlled and site-specific delivery of pharmaceuticals is a widely used method in pharmaceutical industry but the materials that are being used 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 physiochemical properties depending on their collapsed or swollen states enabling the regulation of the drug release. 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.
Technology Features & Specifications
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 Applications
These smart materials are designed to be used in Pharmaceutical Industry for controlled drug delivery.

Customer Benefits
- Enhanced efficacy
- Reduced risk profile
- Increased convenience and compliance

Market Trends and Opportunities
Drug delivery market is expanding rapidly in recent years, with technology enhancement trends and impressive sales growth. Pharmaceutical companies develop new strategies for drug delivery such as product line extensions with these technologies. According to the market reports, drug delivery technology will continue to play an important role in developing next generation drugs, especially in biologics and vaccines. The global market for drug delivery systems in 2010 was $131.6 billion and is expected to rise at a compound annual growth rate (CAGR) of 5% and reach nearly $175.6 billion by 2016.

Additional Technical Information

*PCT patent application:* PCT/TR2014/000288 dated 22.08.2014  
PCT/TR2014/000289 dated 22.08.2014

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*Keywords:* poly(methacrylic acid-grafted-ethylene glycol); P(MAA-g-EG); hydrogel; pH responsive; controlled release

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