



Fabrication of Microparticles with Customizable Size, Shape and Interfacial and Mechanical Properties

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Patent Status:

Patent Pending

Description of Technology

Hydrogels are a gel substance that have water as the liquid component. They have been engineered and used for different applications including drug delivery, cell delivery, and tissue engineering. Reducing the size of these hydrogels to nanoscale and microscale level would greatly extend the range of applications. Hydrogels based on polyethylene glycol (PEGDA) have been widely used but have proved to be difficult to miniaturize. The main barrier of miniaturizing the hydrogels is that oxygen inhibits the necessary chain growth polymerization. Even worse, this inhibition is exacerbated the smaller the hydrogels go.

Researchers at University of Wyoming have invented a method that exploits the oxygen-inhibited photopolymerization to produce size-controlled PEGDA hydrogel particles inside of oil droplets. This allows the size and size distribution of the hydrogels to be tightly controlled. These miniature hydrogels will replace existing, more cumbersome solutions, or even enable an application for which no current method exists.

Applications

The new hydrogels can be used in existing applications more efficiently and can possibly create new applications for which there is no current method.

Features & Benefits

- Allows the size and size distribution of hydrogels to be tightly controlled
- Can create smaller hydrogels than the current method
- Can create new applications of hydrogels for which no current method exists

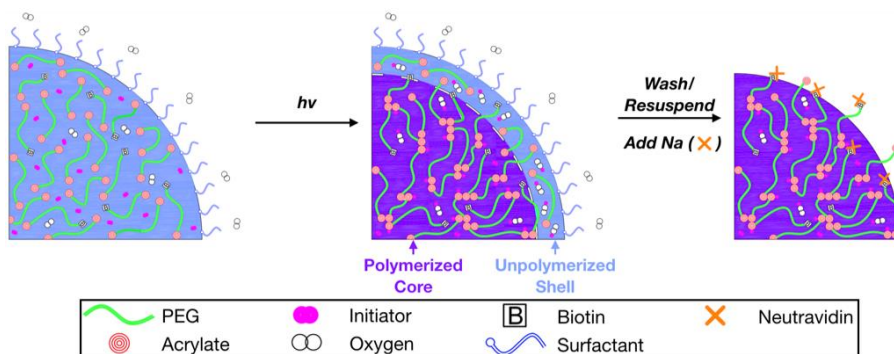


Figure: Schematic of surface-functionalized hydrogel particle fabrication via oxygen-inhibited photopolymerization of droplets within a microfluidic device.

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