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Peanut-inspired anisotropic microparticles from microfluidics

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Abstract

With numerous unique properties, anisotropic particles which have non-spherical morphologies have intriguing great attention in recent years. Here, anisotropic microparticles with the shape of peanuts were fabricated through a novel microfluidic strategy, including microfluidic generation of droplet-containing fiber matrices and deformation of the droplets induced by stretching the fiber matrices. Droplets were emulsified in the microfluidic device system, in which flow rates were precisely controlled to determine droplet size and structure. Through stretching the elastic fibers, encapsulated droplets were able to be deformed into peanut-like shapes, with their interconnected cores well-aligned in correspondence to the stretching direction. Magnetic peanut-shaped particles could be obtained by incorporating magnetic nanoparticles, and showed extraordinary controllable ability under a changing magnetic field. In addition, the microparticles containing platinum and magnetic nanoparticles were generated and found being able to work as microstirrers. These features strongly attested the versatility and promising values of the peanut-inspired anisotropic microparticles in a broad range of application fields.

Graphical asbtract

Anisotropic microparticles with the shape of peanuts were fabricated through a novel

[1] These authors contributed equally to this work.