

CATALYTIC NANO-BOTS: SELF-POWERED NANO-TOOLS IN NANO-BIO-TECHNOLOGY

SÁNCHEZ Samuel

Max Planck Institute for Intelligent Systems, Stuttgart, Germany, EU
Institute for Bioengineering of Catalonia (IBEC), Barcelona, Spain, EU

Abstract

Engineering tiny nano-bots that actively and directly transport payloads to specific locations is envisioned to be part of future nano-bio-technology. Mimicking biomotors, scientists used catalytic reaction to power artificial nano-bots. Self-powered micro-nano-bots can be fabricated from multiple materials, shapes and by various methods, and have demonstrated several proof-of-concept applications in robotics, Lab-chip biosensing, nanomedicine, and environmental field [1].

Nanomotors demonstrated the transport of drugs [2] micro-objects [3] and cells [4] with wireless magnetic guidance [5], temperature [6], and light [7]. Furthermore, they can act collectively reacting to external stimuli like chemotactic behaviour [8] and are capable of cleaning polluted water [9].

Here, I will present our recent developments in this fascinating field. We fabricate nano-bots from mesoporous silica nanoparticles, microspheres and rolled-up thin films into microtubular jets. Very recently, we have found that hybrid Micro-bio-bots combine the best from the two worlds, biology and nanomaterials providing very promising bio-related applications.

Keywords: Nanomotors, nanotechnology, drug delivery, active matter, self-propulsion, bots

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