Catalytic micromotors for biomedical applications

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Micromotors represent one of the most exciting horizons in micro and nanotechnologies. Micrometer-sized motors can either have a conical tubular or spherical structure. The utilization of self-propelled micromotors in (bio)-chemical assays has led to a fundamentally new approach where their continuous movement around the sample and the mixing associated effect, due to the generated microbubbles tail, greatly enhances the target-receptor contacts and hence the binding efficiency and sensitivity of the assay. This effect is a particularly important aspect to consider when low sample and reagent volumes are available, where other convection approaches are lower efficient to produce adequate interactions.

Catalytic micromotors are constituted by few micro- and nanoscale layers and/or encapsulated components, that confer them self-propulsion, sensing/(bio)-functionalization capabilities, and magnetic properties, among others.

Micromotors technology can integrate nanomaterials in its composition and is highly compatible with optical and electrochemical detection techniques, and microfluidic technology. Point-of-care technology and decentralized analysis can benefit from the inherent advantages of this technology, so that, they are an attractive alternative to perform fast, sensitive, and reliable non-centralized laboratory diagnostic testing, even when extremely low volume of sample is available.

In this talk, selected biomedical applications of different catalytic micromotors will be presented.

References

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