

Fabrication of multifunctional titania microcapsules with embedded metallic nanoparticles using microfluidic chips

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Titanium dioxide (TiO₂) has been used as a catalyst for the photodegradation of organic compounds and the deactivation of micro-organisms besides its wide range of application in a photonic field such as dyesensitized solar cells, and photochromic devices. Therefore hollow titania microcapsules are regarded as good candidates for the cancer treatments. Up to now, several ways have been reported to prepare microcapsules, such as nozzle reactor process, emulsion phase separation procedures, and sacrificial core techniques.

In here, spherical titania-based materials embedding metallic nanoparticles were synthesized via water in oil in water (W/O/W) emulsion methods. Adding magnetic nanoparticles or quantum dots in oil phase with titanium precursors, multifunctional titania microcapsules for specific targeting and imaging were directly produced. Moreover, we also fabricated the uniform size of titania microcapsules by forming double emulsion droplets using microfluidic chips.