

Safe-by-design approach for reduced toxicity of silica nanocapsules

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Abstract

Mesoporous silica nanocapsules are a well-known and leading nanocontainers' system applied in several fields (corrosion protection, antifouling, drug delivery). However, it has been already reported that the monomeric cationic surfactant hexadecyltrimethylammonium bromide (CTAB), used as a template in the synthesis of these nanocapsules, should be replaced because of being a source of nanocapsules' toxicity.

In this work we investigate the replacement of CTAB with dimeric surfactants, known as gemini surfactants. Works already available in the literature show that gemini surfactants tend to exhibit lower toxicity to fresh water and marine species than their conventional analogues. Therefore, this study can be envisaged as a safe-by-design approach to silica nanocapsules synthesis by replacing a commercial surfactant (CTAB) with a gemini surfactant (QSB2-12). Nanocapsules prepared using both surfactants were fully characterized by different techniques (BET, FTIR, DLS, TGA, SEM), while the short-term exposure effect was evaluated towards four marine species (the green microalgae *Nannochloropsis gaditana* and *Tetraselmis chuii*, the diatom *Phaeodactylum tricornutum*, and the microcrustacean *Artemia salina*).

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entitled "Smart anticorrosion coatings based on nanocontainers loaded with novel, eco-friendly cationic gemini surfactants as efficient corrosion inhibitors for carbon steel in seawater". The project is being run in CICECO-Aveiro Institute of Materials (University of Aveiro, Portugal). So far, Dr. Kaczerewska (h-index of 5) published 7 research papers and is a co-author of 2 book chapters.



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Biography:

Dr. Olga Kaczerewska completed her PhD (2017) from Faculty of Chemistry, Adam Mickiewicz University in Poznan (Poland). In 2018, Dr. Kaczerewska was awarded a Marie Curie Individual Fellowship (H2020-MSCA-IF-2017) and in September 2018 started a project (EcoGemCoat, 792945)