

Encapsulation via sol-gel of different organic compounds and their characterisation

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Because of its importance in different areas of industry such as agriculture, pharmaceuticals medicine and cosmetics there is an extensive research going on the field of encapsulation [1]. Microcapsules can be considered as small containers filled of active compounds that depending on the final application can hold a very wide range of different materials. Often these capsules are made up of organic materials. However, in recent years researchers have been focusing on the synthesis of inorganic capsules, and in particular, silica capsules due to their great chemical resistance, thermal stability, biocompatibility and their non-toxic quality for the environment [2].

Taking all this into account, in the current study silica microcapsules with diameters in the range of nano, micro, and in some cases almost in the millimetre scale containing different organic compounds have been synthesized combining the sol-gel chemistry with the oil in water microemulsion technology [3]. Having final applications possibilities in mind two types of organic compounds have been encapsulated, epoxy materials and phase change materials (PCM).

It has been observed that as well as the sol-gel parameters the viscosity (which in this case ranges from 3 cP to 6000 cP) and the chemical nature of the compounds have an effect on the size and morphology of the microcapsules. Furthermore in the current study the thermal stability of the organic compounds after been encapsulated as well as the phase change performance of the microencapsulated PCMs have been characterised. In particular the phase change performance is an important parameter for the later application of these materials.

References

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