

SMART CONTROLLED DRUG RELEASE SYSTEMS BASED ON HYBRID MATERIALS

Hybrid materials based on polymers and inorganic materials (e.g. clays (montmorillonite, halloysite) and porous materials (e.g. mesoporous silica, porous clay heterostructures)) are recommended as smart drug release platforms due to their high drug loading/encapsulation efficiency, enhanced drug release profile and low burst release of active pharmaceutical ingredients.

The morphology and textural parameters of inorganic host, the presence of modifier agents within the clay surface or in the gallery, drug encapsulation conditions (pH values, soaking time) and polymer type are important parameters that play a significant role on the performance of organic-inorganic drug delivery systems.

The research topic of our group includes the development of various types of *hybrid drug delivery systems* like dendrimers (PAMAM)/clays, crosslinked films of Poly(vinyl alcohol)/Halloysite/diphenhydramine hydrochloride, hydrogels of Poly(vinyl alcohol)/Halloysite/ acetylsalicylic acid and methacrylate modified halloysite..

The influence of various parameters (initial drug concentration, contact time, pH reaction and temperature) onto the adsorption/intercalation of thiamine hydrochloride (VB₁) within different aluminosilicate hosts (montmorillonite, halloysite) was studied.

Porous clay heterostructures are new hosts for drug encapsulation that exhibit higher drug encapsulation efficiency than classical inorganic materials like montmorillonite.

References:

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