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Layered double hydroxide-based functional nanohybrids as controlled release carriers of pharmaceutically active ingredients

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Abstract

The chemical stability, degradation and penetration ability of pharmaceutically active ingredients in topical formulations are the greatest challenges because of problems with the protection of actives for long times and with delivery. Therefore, the development of unique and efficient substrate material is vital for their protection and controlled drug release. Layered double hydroxides (LDHs) known as hydrotalcite like compounds possess positive charges due to isomorphic substitutions, which are counterbalanced by hydrated exchangeable anions located in the interlayer region. Some of the active ingredient molecules can be intercalated into the inner region of the LDHs through ionic bonding, hydrogen bonding or van der Waals interaction to form nanohybrids, which are more potent for their protection and controlled-release. This account focuses on our recent research efforts and key scientific and technical challenges in the development of LDH based nanohybrids for commercial use in advanced controlled release carriers of active ingredients in topical formulations.