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All: **Mechanochemical preparation and characterization of citric acid intercalated Layered Double Hydroxides (CA-LDH) /montmorillonite clay (CA-MMT) nanohybrids**

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Mechanochemical preparation and characterization of citric acid intercalated layered double hydroxides (CA-LDH) /montmorillonite clay (CA-MMT) nanohybrids

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Current developments in bio-nano-hybrids-based skin formulations have shown a greater promise in cosmeceutical formulations and citric acid is also widely used in these aforementioned formulations. Citric acid is an alpha hydroxy acid that can be used in exfoliating formulations and it has the ability to stabilize the pH of the skin formulations. Here, the efficacy of smart nanohybrids derived from citric acid intercalated layered double hydroxide (CA-LDH) and montmorillonite (CA-MMT) were reported. CA-LDH was synthesized by a novel mechanochem. one-pot synthesis method where citric acid, $Mg(NO_3)_2$, $Al(NO_3)_3$ were mech. ground in the presence of a min. amount of water, and NaOH followed by washing and drying. CA-MMT was also prepared by mechanochem. one-pot synthesis method where Calcium-MMT and NaOH pellets were mech. ground in the presence of a min. amount of water followed by washing and drying. Successful intercalation of CA into LDH and MMT was confirmed using Powder X-ray Diffraction Anal. There was a significant shift in the (003) diffraction peak of nitrate LDH from 10.02 Å to 11.66 Å and (001) diffraction peak of Calcium-MMT from 6.32 Å to 5.82 due to the CA intercalation. The nanosized layered morphol. of CA-LDH and CA-MMT was confirmed by SEM imaging. The presence of favorable interactions between the layered materials and CA was further evidenced by the peak shifts in XPS anal. The interactions between citrate anions and LDH/MMT were further confirmed by referring to the peak shifts (carbonyl group) in FTIR spectroscopy. The thermal stability of the synthesized CA-LDH (521 ^{0}C) and CA-MMT (400 ^{0}C) nanohybrids was compared with CA (294 ^{0}C) by Thermogravimetric anal. The overall results indicate successful intercalation of CA into LDH and MMT. The synthesized nanohybrid opens up new pathways for the development of novel skin formulations.

Conference

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