Synthesis of calcium carbonate microspheres via microalgae-templated CO_2 biomineralization and their application in antimicrobial paint development

Prakash C. Sahoo, 이재형*
KAIST
(jayhlee@kaist.ac.kr*)

We propose an environment friendly approach to synthesize the porous calcium carbonate (CaCO3) microsphere via carbon dioxide (CO2) mineralization using naturally occurring microalgae as bio-template. The CaCO3 microspheres displayed a surface area of 39.1 m2/g with pore diameter ranging from 12-30 nm. In a further approach, the pores of CaCO3 microspheres were used as the host for efficiently accumulate the silver nanoparticles (of size 20-25 nm). The surface morphology and atomic environment of the composite material (Ag-embedded CaCO3 microspheres) was characterized by FE-SEM, TEM, XRD, BET surface area analysis, XPS and TGA. The Ag-embedded CaCO3 microspheres showed excellent antimicrobial properties. Upon the addition of a small amount of Ag-embedded CaCO3 microspheres into the commercial water soluble paints as antimicrobial additives, the new paints provided potent antimicrobial activities against Escherichia coli (E. coli), Psychrobacter alimenterius and Staphylococcus euroum.