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## Nanostructured Zn-Ti layered double hydroxides with reduced photocatalytic activity for sunscreen application

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### Abstract

The harmful effects of long-term UV exposure on human skin are increasingly understood these days, and therefore, the use of topical sunscreen products containing UV filters has significantly increased. Although the currently used organic and inorganic UV filters are effective UV absorbers, they may cause several problems such as high photoreactivity, photodegradation, and generation of reactive oxygen species leading to serious skin damages including skin cancer. Therefore, the development of safer, skin-compatible, photostable, and more effective photoactive ingredients is critical. In this study, a Zn-Ti layered double hydroxide (Zn-Ti LDH) was prepared using a hydrothermal method, and its properties as a sunscreen additive were evaluated and compared to those of nano-TiO(sub2) and nano-ZnO. Physical characterization confirmed the formation of a highly stable crystalline LDH structure. Scanning electron microscopy analysis revealed the formation of two-dimensional nano-flakes and layered structure. The optical properties of Zn-Ti LDH analyzed by diffuse reflectance UV-Vis showed higher UV reflection properties and lower absorption properties in comparison to TiO(sub2) and ZnO. Zn-Ti LDH exhibited substantially lower levels of photocatalytic activity towards the degradation of methylene blue at both 365 nm and 254 nm which indicates increased safety of Zn-Ti LDHs for use as UV filters in topical sunscreen applications.