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Abstrak

Pencemaran alam sekitar telah menjadi tumpuan ramai dalam industri seni bina kerana ia menyebabkan kesan estetika kepada bangunan bandar. Oleh sebab itu, perkembangan penglitup yang mengandungi fungsi pembersihan diri memainkan peranan penting dalam pencapaian penglitup untuk bangunan-bangunan supaya lebih berdaya saing dan membendung kos penyelenggaraan yang tinggi. Kajian ini merupakan kajian awal untuk menguji keberkesanan Nano TiO_2 sebagai bahan aditif sebelum perkembangan dan kajian lanjut boleh dilakukan. Oleh sebab keupayaan Nano TiO_2 yang dapat mempercepat degradasi bahan cemar organik, titanium dioksida nanometric (TiO_2) telah dipilih sebagai bahan fotopemangkin yang berpotensi. Nano TiO_2 telah pra-disintesis dalam bentuk cecair sebelum ia dimasukkan ke dalam sistem penglitup berasaskan akrilik, iaitu formula yang sedia ada--cat luaran Nippon Weatherbond, Pastel Base dan Deep Base. Saiz nanometric TiO_2 telah dikenalpasti dengan menggunakan SEM dan dos optimum Nano TiO_2 dalam penglitup (cat) akan ditentukan dengan eksperimen. Ciri-ciri fizikal seperti kelegapan, keputihan dan warna cat telah ditentukan dengan menggunakan peralatan yang betul. Satu siri kajian untuk menguji keberkesanan NanoTiO_2 dalam cat-cat tersebut seperti ujian aplikasi, ujian rintangan cuaca, ujian rintangan UV, ujian rintangan kekotoran “streak mark” dan lain-lain telah dijalankan untuk mengkaji sifat-sifat pembersihan diri dari segi cat basah dan filem cat yang kering. Morfologi permukaan filem cat fungsi hidrofilik dan “contact angle” telah dikaji bersama. Keputusan menunjukkan bahawa cat dengan dos tambahan 3% NanoTiO_2 berupaya memberi fungsi pembersihan diri yang lebih baik, dan ia dapat dilihat dengan ketara melalui ujian rintangan cuaca, ujian rintangan kekotoran “streak mark”, keberkesanan fotopemangkinan, “contact angle” dan lain-lain

Abstract

Environmental pollution has become a concern of the architectural industry as it causes aesthetical effects to urban buildings. Thus, the development of a coating which contains self-cleaning behavior plays a crucial role in the achievement of more competitive architectural coatings and to curb the cost of high maintenance. This preliminary study wish to test the effectiveness of Nano TiO_2 as an additive prior more developments and formulations can be done. Due to the ability to accelerate degradation of many organic contaminants, nanometric titanium dioxide (TiO_2) has been selected as the promising photocatalytic material. Nano TiO_2 were pre-synthesized in dispersed form before it is incorporated into the acryllic based coating system, the existing formula of exterior paint Nippon Weatherbond colour bases i.e. Pastel Base and Deep Base. The nanometric size of nano TiO_2 were experimentally examined by using SEM and the optimal dosage of the nano TiO_2 in the coating will be determined from the experiments. Physical properties such as opacity, whiteness and colour were determined by using the right tools. A series of coating properties tests e.g. application test, harsh weather resistance test, UV irradiation resistance, dirt pick-up test and etc were carried out to study the properties of self-cleaning coating in terms of wet paint and dry paint film. Paint film surface morphology such as hydrophilicity and contact angle were being studied as well. The results shown that coatings with NanoTiO_2 additive with 3% dosage is able to perform better in terms of self-cleaning, which can be significantly observed through Dirt Pick Up Resistance Test, Dirt Streak Mark Test, photocatalytic effectiveness, contact angle measurement and etc.

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