عنوان مقاله:

Enhancement of Pigments Hydrophobicity by Mixing with Cr Doped SiO۲ Nanoparticles

محل انتشار:

نشریه متدهای شیمیایی, دوره 7, شماره 5 (سال: 1402)

تعداد صفحات اصل مقاله: 13

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خلاصه مقاله:

In this paper, pure and Cr-doped SiO۲ was prepared by sol-gel method and deposited on glass substrates by dip-coating and calcination of the resulting thin films at ۵۰۰ °C. An X-ray diffraction examination was performed for the pure and doped films, where we note the appearance of a spectrum in the form of a wide band at the equivalent Bragg angle at ۲θ = ۲۲.۶°, which indicates that the obtained material is amorphous silica. After that, field emission scanning electron microscopy was conducted to study the morphology of the pure SiO۲ thin layer doped with chromium, as it appears that the prepared film is of good quality and free of cracks and holes, as we note that the crystals adopted certain geometric shapes with different sizes and shapes. Likewise, the particle distribution is uniform with the spherical shape. By examining the atomic force microscope to study the surface topography and roughness, we notice that the surface roughness increases with the increase in the doping percentage, where the surface roughness values of the samples vary between (۲.۹۴-۵.۲۲) nm, and we will get the highest surface roughness values at a concentration of ۹%. After preparing the SiO۲ nanoparticles, they are mixed with the pigment and deposited on the glass substrates using the dip-coating method to measure the contact angles and study the duration of the effect of SiO۲ particles on the pigment. In addition, by measuring the contact angle between a drop of water and the coating surface, we notice that the contact angle increases after adjusting the coating by adding pure SiO۲ doped with chromium and mixed with the pigment, as the contact angle increases from (۹۵.۷۱°) to (۱۰۷.۱۷°) depending on the surface roughness. The surface roughness and its energy are important factors affecting the contact angle.

کلمات کلیدی:

SiO۲ Sol, gel Pigment Doping Dip coating