PO4048

ADVANCES IN SURFACE MODIFICATION OF MICROPARTICLES BY PLASMA POLYMERIZATION

Maria Monteserin, L. Francisco Martin, Silvia Larumbe, Gonzalo G. Fuentes

Advanced Surface Engineering Center, AIN, Cordovilla, Spain

mmonteserin@ain.es

Nowadays, inorganic pigments play a very important role in the development of paints, ceramics, and inks, being also used in the fabrication of polymeric composites. This kind of nano and micrometric particles have high tendency to aggregation, which limits their processability and performance due to the fact that their unique characteristics are not fully exhibited when they are poorly dispersed. Surface modification has been shown to be a very useful way to overcome this hindrance. Furthermore, surface modification of the pigments may also allow to improve their inherent properties or even to add new and advanced functionalities to the material (e.g.: enhanced stability against light, heat or chemical aggressions, etc.), which can lead to the development of novel products with high added value.
Hence, various methods have been developed to change the surface properties of nano and microparticles. Most common are wet-chemical methods, including sol-gel, intercalation polymerization and in situ polymerization, among others. However, these methods are usually complicated, time-consuming, energy-inefficient and environmentally hazardous. Plasma coatings has been shown as a safe, simple, and environmentally friendly alternative to wet processes, that are carried out avoiding the use of solvents (dry conditions) and usually operate at room temperature. Through plasma treatments both surface activation processes and ultrathin coatings can be deposited on the pigments.
In this work, PE-CVD plasma polymerization has been used to improve the dispersion of different pigments in aqueous and organic solvents used in the formulation of paints. Surface activation of the pigments has been carried out with argon and oxygen plasmas in different process conditions with diverse outcomes. Furthermore, thin film coatings based on oxides have been deposited by plasma polymerization in several pigments in order to improve their resistance to heat and UV light, which can cause the degradation of the pigments and a shortening of their life cycle.

Keywords
plasma polymerization
nanoparticles
UV-light protection