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**Adding advanced functional properties to nanoparticles via low-pressure plasma coating**

Anna Usoltseva, Christophe Rigaux, Simon Wallon, Cedric Vandenabeele, Stella Mathioudaki, Stephane Lucas

Namur University, Namur, Belgium

anna.usoltseva@unamur.be

Nanoparticles (NPs) are now the object of intense study due to their perspective properties and numerous industrial applications. Some of these applications are facing with several limitations based on excessive reactivity or conversely low affinity to some matrixes. Nanoparticles coating can solve these problems creating a protective layer or changing the chemical composition of the surface, which can improve NPs incorporation and distribution in different matrixes.

In the present study the surface modification of nanoparticles of different nature (metals, metal oxides, ceramics etc.), size and morphology was performed via a low-pressure plasma polymerisation process. The composition and the morphology of created coating were characterized by physical methods (XPS, TEM, TGA). It was shown that the surface composition and the thickness of the coating are controlled by a variation of plasma treatment parameters.

The formation of an effective protective layer around nanoparticles that changes the material properties from hydrophilic to hydrophobic was demonstrated. We have also shown that the plasma treatment increase the NPs affinity towards various solvents resulting in improved NPs distribution in polymer matrices.

**Keywords**

nanoparticles

coating

functionalization

low pressure plasma

plasma polymerization