

## P4.3014 Nanoparticles de-agglomeration in non-equilibrium low-pressure radiofrequency plasma

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See the full abstract here:

<http://ocs.ciemat.es/EPS2019ABS/pdf/P4.3014.pdf>

This contribution describes an interesting phenomenon concerning the interaction between a non-equilibrium low-pressure radiofrequency plasma and aggregated particles injected into it. This phenomenon is related to the particle de-agglomeration when they are injected in a plasma. In order to develop nanoparticle metrology diagnostics in “dry environment”, a unique experimental device has been developed, composed of a low-pressure radiofrequency plasma reactor and a nanoparticle injector allowing the characterization of nanoparticles by non-intrusive metrology diagnostics. The particles injected into the plasma gas phase are trapped and levitate within the chamber. The average size of the nanoparticles obtained by the developed methods are in general smaller than the average size given by the manufacturer, but in quite good agreement with those (in the reactor) given by transmission electron microscopy. The injection of the particles is regarded by mean of a fast camera. We observed that during the injection, the particles de-agglomeration ration reaches up to 90%. The analysis of particles by metrology methods in plasma makes it possible not to analyze the aggregates, but the primary particles. This phenomenon opens many ways in particular for toxicity control and presence of so-called nanoparticles (less than 100nm) in ingredients from, for example, the pharmaceutical or cosmetic industry. Moreover it allows the study of the interactions between plasma and aggregated particles.

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