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# Pulsed aerosol assisted plasma deposition: influence of the injection parameters on ZnO/DLC nanocomposite thin films

A. Girardeau<sup>1,2,3</sup>, G. Carnide<sup>1,2,4</sup>, A.F. Mingotaud<sup>4</sup>, M. Cavarroc<sup>3</sup>, M.L. Kahn<sup>2</sup>  
and R. Clergereaux<sup>1</sup>

<sup>1</sup> LAPLACE, CNRS UMR5213, Université de Toulouse, 118 route de Narbonne, 31062, Toulouse, France

<sup>2</sup> LCC, CNRS UPR8241, Université de Toulouse, 205 route de Narbonne, 31077 Toulouse, France

<sup>3</sup> Safran Tech, Pôle M&P, Rue des Jeunes Bois, 78772 Magny les Hameaux, France

<sup>4</sup> IMRCP, Université de Toulouse, CNRS UMR 5623, Université Toulouse III - Paul Sabatier, 118 route de Narbonne, 31062, Toulouse, France.

Aerosol-assisted processes enable to deposit thin films, homogeneous [1,2] or nanocomposite [3,4,5,6]. For example, the nebulization of colloidal solutions, *i.e.* liquid solutions containing nanoparticles, in different plasma processes has been widely used for nanocomposite thin film deposition. However, nanoparticles loaded droplets in the aerosol lead to the deposition of aggregated nanoparticles embedded in the matrix.

Recently, a new process of nanoparticles injection has been developed [7]. This method, called reactor-injector of nanoparticles, consists in synthesizing nanoparticles prior to their injection in the plasma in a pulsed injection regime. It enables to form nanocomposite thin films with really small (<10 nm in diameter) and highly dispersed nanoparticles embedded in the matrix [7].

This work aims to study the deposition of ZnO/DLC nanocomposite thin films in a low-pressure RF plasma. The main challenge of this process is to find the best compromise between the parameters for an efficient synthesis of ZnO nanoparticles and an optimal behaviour of low-pressure RF plasmas in a pulsed regime. It is shown that the operating window enables to deposit nanocomposite thin films with an extended range of volume fraction.

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