INFLUENCE OF GAS PULSED INJECTION IN DIELECTRIC BARRIER DISCHARGES AT ATMOSPHERIC PRESSURE.

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Résumé

Nanocomposite (NC) thin-films are widely studied due to the multifunctional properties they can develop (optical, electrical, mechanical). A lot of methods are under development with a real attraction for processes at atmospheric pressure, such as dielectric barrier discharge (DBD). Nebulization of colloidal solutions have been used for thin film deposition. However, most of the time, the nanoparticles embedded in the matrix are aggregated and locally deposited to the key role of gravity.

Recently, reactor-injector has been developed. This new method consists in synthesizing the nanoparticles prior to their injection in the plasma. However, this method works in a gas pulsed injection regime. This work aims to study the impact of a gas pulsed injection on the stability of a DBD at atmospheric pressure. In contrast with the Townsend discharge obtained in N_2, the addition of a pulsed injection of N_2 causes a sudden increase of the gas velocity and the pressure that destabilize the discharge during a few periods. Indeed, after the pulse of carrier gas, the discharge becomes filamentary. The reactor-injector parameters are then adjusted to remain in a homogeneous and stable discharge, the latter being more relevant for deposition processes.

Références

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