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**OPTICAL EMISSION SPECTROSCOPY OF A LINEAR GAS-FLOW SPUTTER SOURCE FOR NANOPARTICLE GAS-AGGREGATION**

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In this work, we present the optical diagnostic of a gas aggregation source for deposition of nanocomposite coatings using a combination of gas phase condensation (GPC) and standard PECVD processes. This experimental setup has various applications such as advanced TiO<sub>2</sub> photocatalytic thin films, conductive polymer composites for sensors, plasmonic coatings, and structured surfaces for condensation and heat transfer.

Ag Metal nanoparticles are synthesized by inert gas phase condensation (GPC) of sputtered atomic vapor, transferred into the gas flow by a hollow cathode Gas Flow Sputtering (GFS) source. Both pressure in the aggregation zone and discharge power strongly affect Nanoparticles Size distribution and plasma characteristics.

The optical diagnostic of the gas-flow sputter source was carried out in the research of oscillations due to dusty plasma phenomena. Despite the lack of regular oscillation, transitory and oscillatory phenomena were recorded and a tentative interpretation of the observed phenomena and of their dependence on experimental parameters such as gas flow, pressure, and power are proposed.

**Keywords**

Ag  
nanoparticles  
gas flow sputtering  
OES  
gas aggregation