



# LARGE-AREA NANOPARTICLE DEPOSITION USING GAS AGGREGATION PROCESS

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## Abstract

The continuous growth of academic interest for nano-fabrication topic since the mid-90's is also observed in the steady growth of granted patents and gives hope for a future potential industrial applicability.

The gas aggregation process is a pertinent process, overcoming the limitations of both wet-chemical methods and of mask lithography (speed, deposition area). This process can be combine with standard vacuum deposition processes and integrated into standard vacuum deposition tools, but must be up-scaled to large-area deposition for industrial applications.

Gas aggregation setup established in collaboration between TU Dresden (IFE) and FEP consists in a gas-flow-sputtering nanoparticles source (Hollow cathode), a PECVD matrix deposition source, an Etching unit, and a 4th station for possible extension (Magnetron Sputtering Matrix deposition or CNT deposition by ESI)

The originality of this setup lies in its dimensions (aggregation volume  $\approx 100\text{L}$ ; up to  $3\text{slm}$  gas flow) Adjustable slit opening between aggregation and deposition zones, allowing a  $12\text{mm}$  wide Plane jet in the dynamic vacuum setup, translating in up to  $20\text{mm}$  wide nanoparticle deposition.

After presenting the technical setup and its operation principle, this work will show obtained results for the deposition of Ag NP –  $\text{SiO}_x$  Metal-polymer nanocomposites (Deposition rate  $15\ldots 60\text{nm/min}$ )

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