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**Synthesis of particles from different metals by an atmospheric pressure plasma jet: a comparative study**Gheorge Dinescu<sup>1</sup>, Valentina MARASCU<sup>2</sup>, Andrada Lazea-Stoyanova<sup>2</sup><sup>1</sup>I.N.F.L.P.R., Magurele-Bucharest, Romania <sup>2</sup>I.N.F.L.P.R. / Faculty of Physics, U.B.,  
Magurele-Bucharest, Romania

dinescug@infim.ro

In the last decades, nano and micro metallic particles, have been investigated due to the unique properties when compared with their bulk metal counterparts. Mainly the large surface-to-volume ratio and the diversity of shapes and microstructures opened the door for a multitude of applications. As a result, various generation methods are nowadays developed and studied.

This contribution presents a versatile radio-frequency (RF) plasma jet source that operates in argon at atmospheric pressure, suitable for generation of metallic particles from bulk metals such as iron, copper, titanium, zinc or nickel. The metal source was represented by the RF powered electrode. More details on the plasma jet operation and the mechanism of production of copper particles one can find in Ref. [1, 2]. Optical and Scanning Electron Microscopy (SEM) analyses show that in selected conditions particles can be obtained, regardless of the used metal type. Energy Dispersive X-ray Spectroscopy (EDS) investigations reveal that metallic or oxide particles were synthesised. Depending on the applied RF power nano-particles with diameters between 20 and 50 nm or micro-particles with sizes of 1 to 3  $\mu\text{m}$  were obtained. Moreover, the size, structure and shape of the particles is influenced by the metal type.

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**References**

[1] A. Lazea-Stoyanova et. al, Plasma Processes and Polymers, Vol. 12, Issue 8, 705-709, 2015.

[2] V. Marascu et. al, Plasma Processes and Polymers, Vol. 15, Issue 1: e1700091, 2018.

**Keywords**

metallic particles

synthesis

RF plasma

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