

## **Production of additive manufacturing powders by thermal plasma**

Sergio GALVAGNO – *ENEA*

Additive manufacturing (AM) is a new and alternative way to produce goods and objects in many industrial fields. The “additive” approach allows to create objects with geometries and shapes unobtainable by using the classic “subtractive” one. The growing diffusion of these 3D printing techniques promotes the development of new printing materials from polymers and resins to metals and ceramics. Among these materials, metal powders represent a growing market; in particular, spherical powders play a leading role, attracting great interest in prototyping and production. Usually, these powders are produced by Water Atomization (WA) and Gas Atomization (GA); however new techniques, such as Plasma Atomization (PA) and Plasma Spheroidization (PS), are gaining increasing interest. In this frame, ENEA developed a new prototypal plant for the production of powders for AM; the system, based on DC thermal plasma technology, was own designed and installed at ENEA Portici Research Centre. Several tests were carried out with the aim of exploring the potentiality of the plant and identifying the best process parameters to produce spherical powders. In addition, the treatment of secondary raw materials as feedstock, in order to promote the closure of the cycles, was also conducted.