Electrospray application to powder production and surface coating

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Abstract

Electrospray application to fine powder particles generation, surface coating, nanocomposite material production, and 2D or 3D printing have been reviewed in this paper. Electrospray is a process of liquid atomization via imposing the electrical forces on the liquid jet flowing from a capillary nozzle. The presented results demonstrate that electrospraying is a versatile tool, which is able to generate fine droplets of uniform size. The advantage of electrospraying is that it is a single-step, low-energy, low-cost and flexible production process, which allows production of droplets smaller than 10 μm. In most cases, the process can be performed at ambient temperatures and atmospheric pressure. It was shown that variety of 2D or 3D micro- or nanocomposite structures can be effectively produced by the dot-by-dot technology from a single nozzle or from combined nozzles. Those structures can be formed from organic or inorganic materials, obtained after solvent evaporation from microdroplets generated from a solution of the material to be deposited or its precursor.

Keywords: electrospraying; EHDA; surface coating; powder production; microencapsulation; jet printing.