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Electrospraying in a complex electrical field: jet formation and characteristics of final product SHEILA KHODADADI, KIRSTEN ROVERS, GABRIEL MEESTERS, Delft University of Technology, TUDELFT-DELFT PROJECT MANAGMENT TEAM — The electrohydrodynamic atomization (EDHA) of liquid solutions is a technique developed to produce micro and nanometer size droplets. It consists of breaking a liquid jet by applying electrical forces. EHDA is one of the most suitable techniques for drug delivery and bio-nanotechnology, when precise (nm-μm) particle size and narrow size distribution is needed. However there are some challenges facing application of this technique such as limitation in flow rate, characteristics of liquids (surface tension, conductivity,...), and the possible droplet size reduction due to evaporation of the liquid and Coulomb fission. To tackle these challenges in an EHDA-based inhalation device, we explored different possibilities to reach a stable mode in terms of jet formations, droplet-particle size and size distribution. In this contribution, we demonstrate how device configuration and operational conditions influence the electrosprayed liquid and final product. We will also discuss how our approach can be used to tailor morphological properties of nanostructured materials with identical chemical compositions.

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