Büchi Mini Spray Dryer S-300

POLiS
Post Lithium Storage
Cluster of Excellence

Description

A **spray dryer machine** is a device used to convert a liquid slurry or suspension into a dry powder through rapid drying with a hot gas (usually air or nitrogen). It works by atomizing the liquid into fine droplets and exposing them to a hot drying medium in a chamber, where moisture evaporates almost instantly, leaving behind solid particles.

Spray dryers are used for the following in battery research

- Synthesis of cathode and anode powders
- Controlling the morphology and particle size of battery materials
- For scalable and reproducible processing.

Specifications

The Mini Spray Dryer S-300 offers advanced automation to enhance process efficiency, provide consistent results, accelerate formulation optimization and stream line the scale-up process of battery active materials

- Compatible with water, acids, alkalines and organic solvents.
- Maximum inlet temperature of 220^{0}C with upto 70% yield.
- Synthesis of particle with average particle size distribution ~ 1- 25 µm possible.
- Maximum sample throughput of 1l/h.
- The Inert Loop accessory enables the safe processing of samples containing organic solvents.

Case studies

1. Spray-drying synthesis of $Na_4Fe_3(PO_4)_2P_2O_7$ @CNT cathode for Sodium-ion batteries

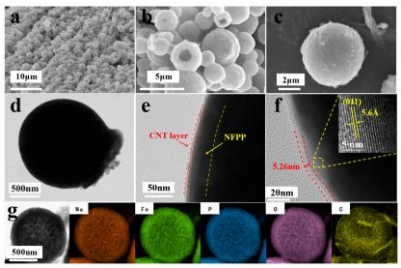

Fig 1: Morphological characterisation of NFPP@CNT-1% synthesised via spray drying method [1]

2. Co-precipitation spray-drying synthesis of $LiNi_{0.5}Mn_{1.5}O_4$ cathode materials

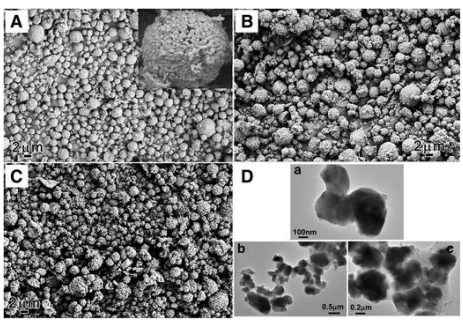

Fig 2:SEM images of $LiNi_{0.5}Mn_{1.5}O_4$-Carbon nano flake composite synthesized via spray drying method [2]

Publications

1) J. Huang, Z. Zhang, Y. Wu, D. Chen, H. Yu, Y. Chen, *Molecules* **2025**,*30*, 753

2) Y. Ma, L. Wang, X. Zuo, J. Nan, *J. Solid State Electrochem.* **2018**, *22*, 1963-1969