

THE EFFECT OF ENVIRONMENTAL FACTORS ON THE DRYING OF AEROSOL DROPLETS CONTAINING DISPERSED PARTICLES

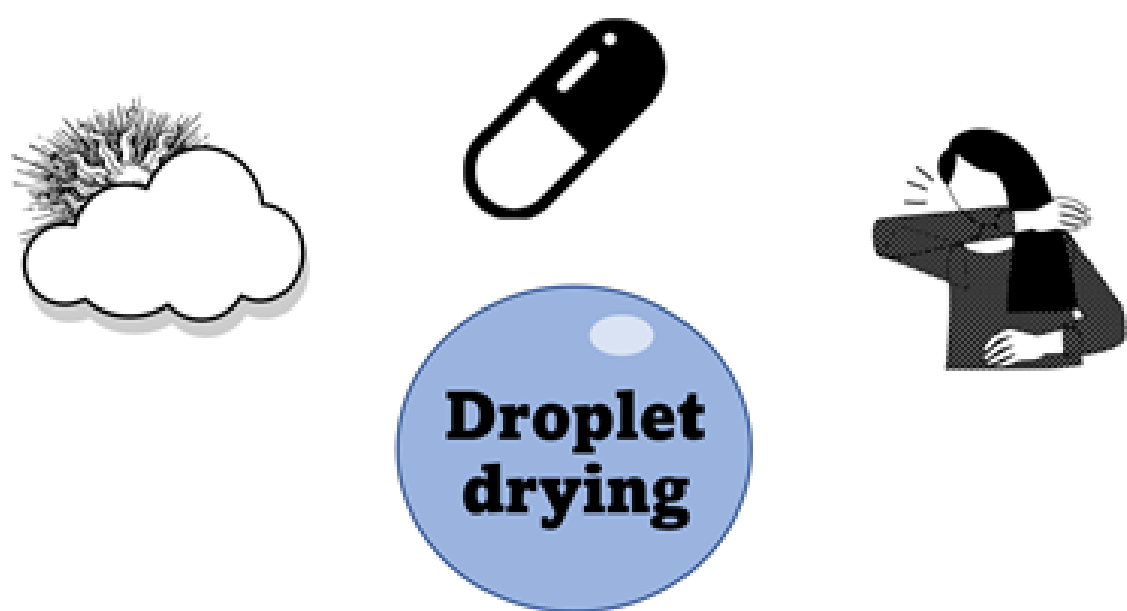
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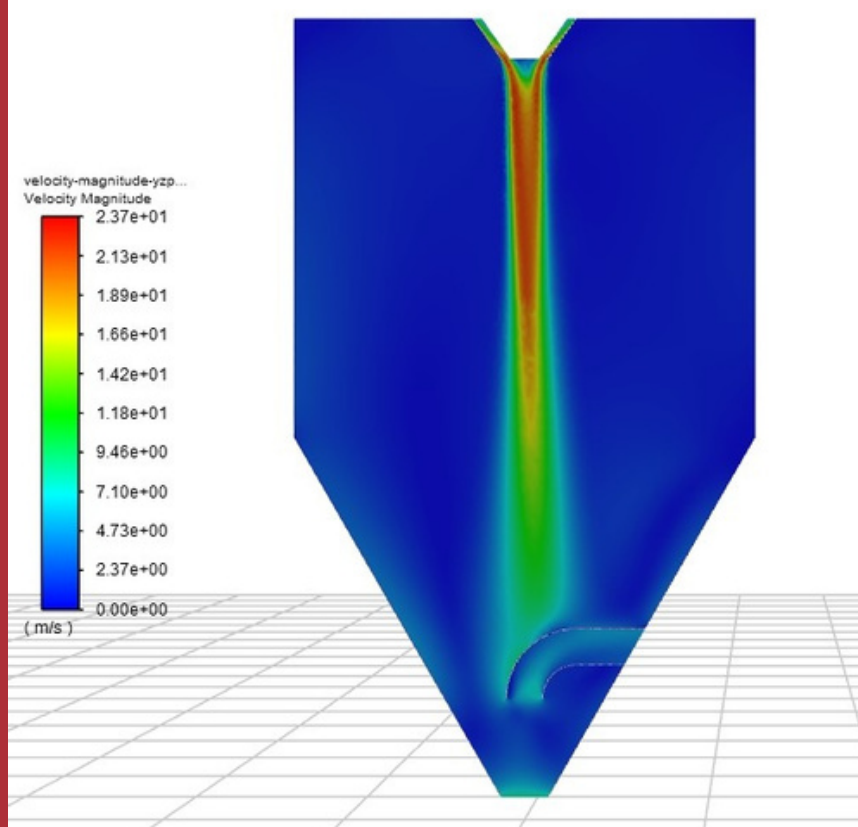
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Motivation



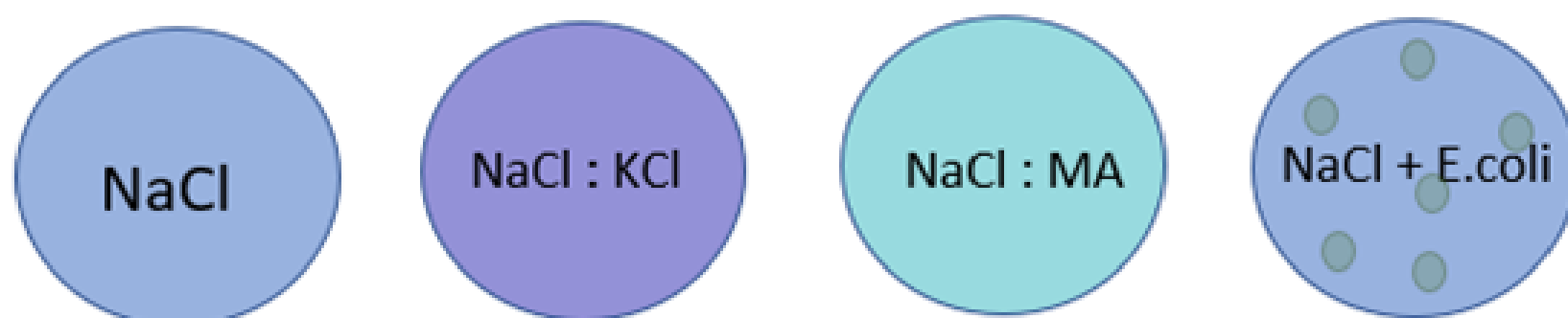
TBS - CFD modelling of Spray Dryers



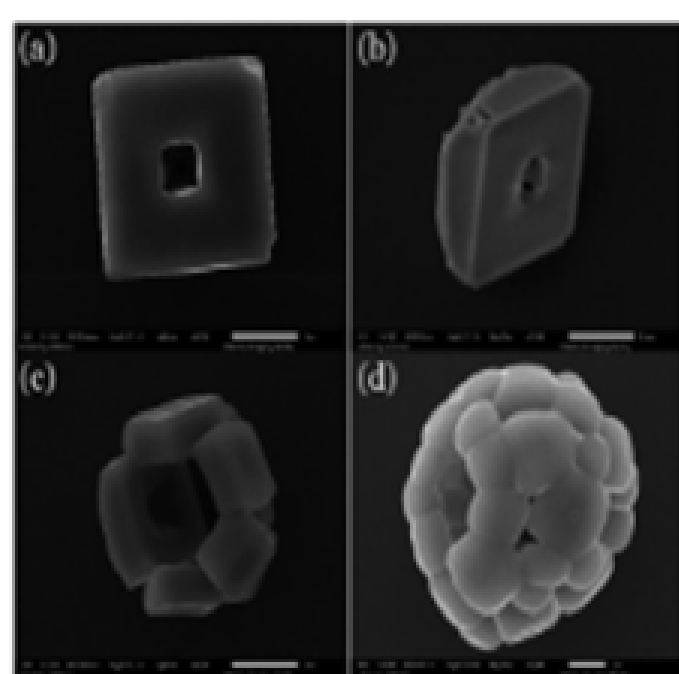
Velocity magnitude cross section (in the yz-plane) of the airflow in a Kieviet spray dryer.

Modelled in Ansys Fluent using boundary conditions from L.Huang, K. Kumar and A. Mujumdar, *Drying Technol.*, 2003, **21**, 957-978

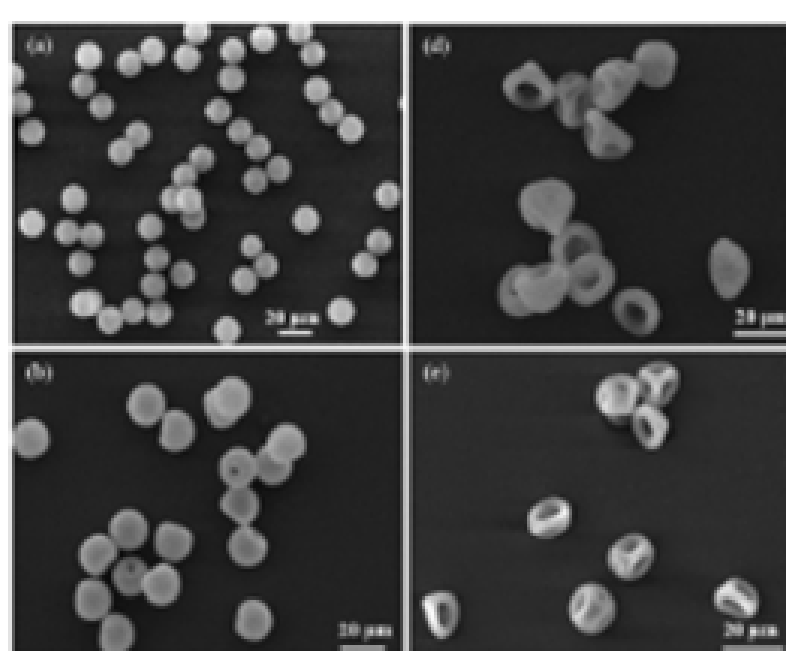
Background



Efflorescence relative humidity and deliquescence relative humidity are well defined for most systems.



Scanning Electron Microscope (SEM) images of particles formed in a falling droplet column (FDC). (a and b) 40% RH, (c) 25% RH, and (d) 0% RH. ²



SEM images of dried silica nanoparticles. (a) 64% RH, (b) 21% RH, (c) 8% RH, (d) 5% RH. ²

Methodology

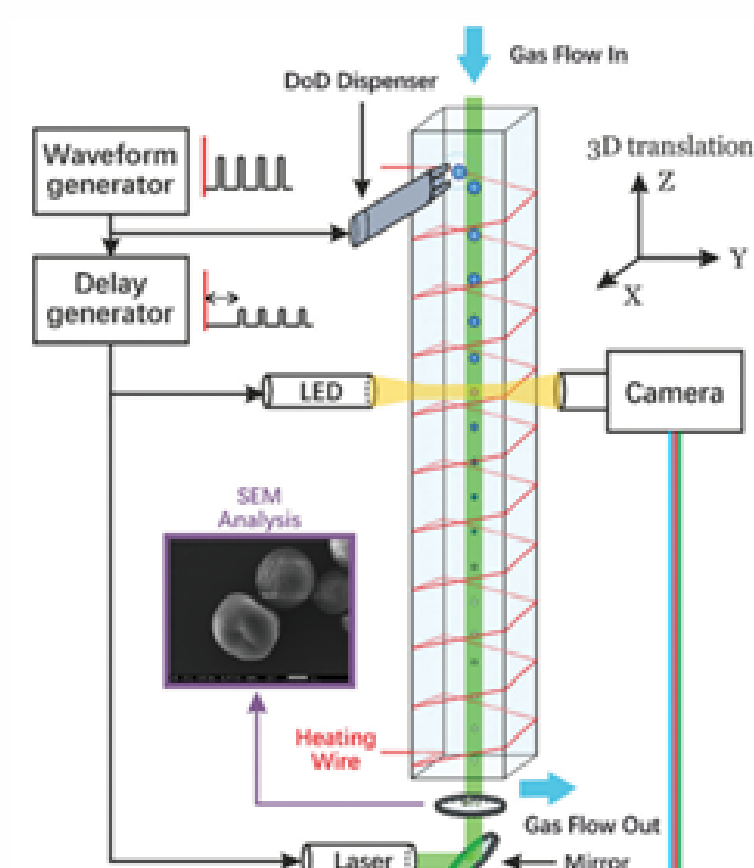


Fig 1. Schematic of a Falling droplet column. ²

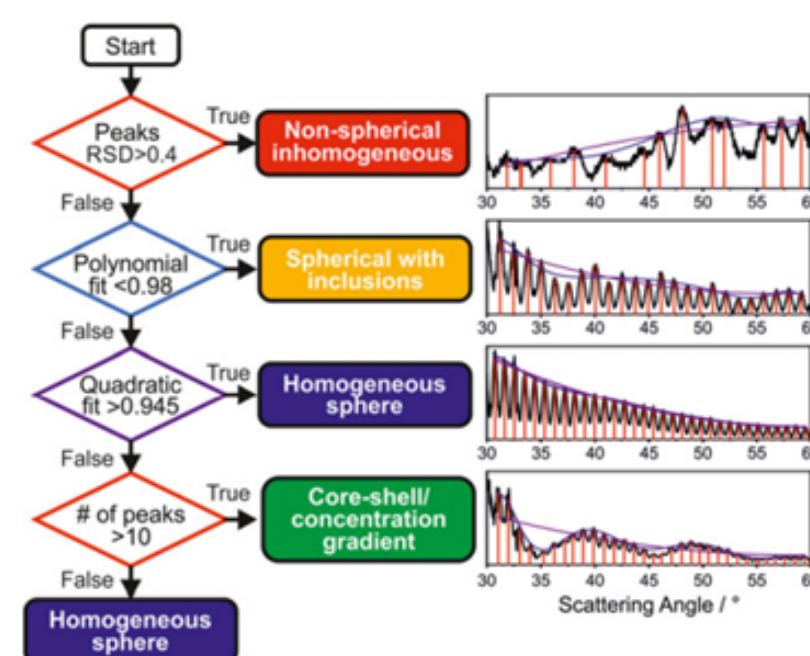


Fig 2. Flow chart to differentiate particle type based on the phase function. ³

References

1. D. Hardy, J. Archer, P. Lemaitre, R. Vehring, J. Reid and J. Walker, *Phys. Chem. Chem. Phys.*, 2021, **23**, 18568-18579.
2. J. Archer, J. Walker, F. Gregson, D. Hardy and J. Reid, *Langmuir*, 2020, **36**, 12481-12493.
3. A. Haddrell, G. Rovelli, D. Lewis, T. Church and J. Reid, *Aerosol Sci. Technol.*, 2019, **53**, 1334-1351.