Particle Deposition Readme

Description

This dataset contains fluorescence microscopy (v1) and interferometry videos (v2) of particle deposition from evaporating colloidal drops, comparing ellipsoidal and spherical particles, as well as particles with varying wettability.

For video v1, the ellipsoid aspect ratio was k=6.5 and video v2 is for spherical particles (aspect ratio k=1). For both cases, the carrier liquid was water, and the ambient relative humidity (RH) was 40% and the particle volume fraction was 1%. Uniform deposition is observed for ellipsoids while the coffee ring deposition is for spherical particles.

Videos v3 and v4 correspond to interferometry recordings of deposition processes involving 20nm polystyrene particles with different wettability, showing the effect of particle wettability on contact line dynamics [2]. v3 features carboxylate-modified polystyrene particles of 34° water contact angle while v4 is for carboxyl polystyrene particles of 74° water contact. For both cases, the carrier liquid was water, the ambient relative humidity was 35%, and the particle volume fraction was 0.25%. Continuous contact line receding is observed in v3 whereas the stick-slip motion of the contact line is evident in v4.

Data structure

The dataset folder has 4 video files:

v1. deposition_ellipsoidal_particles.avi [1]

v2. deposition_spherical_particles.avi [1]

v3. deposition_carboxylPS_nano_particles.avi [2]

v4. deposition_carboxylatePS_nano_particles.avi [2]

References:

1. Kim, D.O., Pack, M., Hu, H., Kim, H. and Sun, Y., 2016. Deposition of colloidal drops containing ellipsoidal particles: Competition between capillary and hydrodynamic forces. *Langmuir*, 32(45), pp.11899-11906.

2. Kim, D.O., Pack, M., Rokoni, A., Kaneelil, P. and Sun, Y., 2018. The effect of particle wettability on the stick-slip motion of the contact line. *Soft Matter*, *14*(47), pp.9599-9608.