

Abstract Submitted
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Evaporation effects in elastocapillary aggregation DOMINIC VELLA, ANDREAS HADJITTOFIS, KIRAN SINGH, Mathematical Institute, University of Oxford, JOHN LISTER, DAMTP, University of Cambridge — We consider the effect of evaporation on the aggregation of a number of elastic objects due to a liquid's surface tension. In particular, we consider an array of spring–block elements in which the gaps between blocks are filled by thin liquid films that evaporate during the course of an experiment. Using lubrication theory to account for the fluid flow within the gaps, we study the dynamics of aggregation. We find that a non-zero evaporation rate causes the elements to aggregate more quickly and, indeed, to contact within finite time. However, we also show that the number of elements within each cluster decreases as the evaporation rate increases. We explain these results quantitatively by comparison with the corresponding two-body problem and discuss their relevance for controlling pattern formation in carbon nanotube forests.

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