Abstract Submitted
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Coalescence of Pickering emulsion droplets induced by electric-field[1] GUO CHEN, PENG TAN, Department of Physics, CUHK, Hong Kong, SHUYU CHEN, Department of Physics, HKUST, Hong Kong, JIPING HUANG, Department of Physics, Fudan University, Shanghai, China, WEIJIA WEN, Department of Physics, HKUST, Hong Kong, LEI XU, Department of Physics, CUHK, Hong Kong — Combining high-speed photography with electric current measurement, we investigate the coalescence of Pickering emulsion droplets. Under high enough electric field, the originally-stable droplets coalesce via two distinct approaches: normal coalescence and abnormal coalescence. In the normal coalescence, a liquid bridge grows continuously and merges two droplets together, similar to the classical picture. In the abnormal coalescence, however, the bridge fails to grow indefinitely; instead it breaks up spontaneously due to the geometric constraint from particle shells. Such connecting-then-breaking cycles repeat multiple times, until a stable connection is established. In depth analysis indicates that the defect size in particle shells determines the exact merging behaviors: when the defects are larger than a critical size, normal coalescence will show up; while abnormal coalescence will appear for smaller defects.

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