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Eliminating cracking during drying QIU JIN, PENG TAN, Department of Physics, The Chinese University of Hong Kong, Hong Kong, ANDREW B. SCHOFIELD, The School of Physics and Astronomy, University of Edinburgh, Edinburgh, UK, LEI XU, Department of Physics, The Chinese University of Hong Kong, Hong Kong — When colloidal suspensions dry, stresses build up and cracks often occur - a phenomenon undesirable for important industries such as paint and ceramics. We demonstrate that the two viscoelastic moduli, G' and G'', determine the cracking behavior. By adding emulsion droplets into colloidal suspensions, we systematically decrease the storage modulus, G', and increase the importance of the loss modulus, G'', and effectively decrease the amount of cracks. At a critical droplet concentration, cracking disappears completely. Furthermore,adding droplets also varies the speed of air invasion and provides a powerful method to adjust drying rate. With the effective control over cracking and drying rate, our experiment may find important applications in many drying and cracking related industrial processes.

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