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Solid-liquid phase transitions of fire ant rafts and towers

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Fire ants, Solenopsis invicta, link their bodies together to form waterproof rafts, which in turn drip, spread, and coagulate, demonstrating properties of an active material that can change state from a liquid to a solid. This soft-matter phase transition permits the raft to withstand environmental forces such as raindrops and crashing waves. We present our overview of our combined experimental and theoretical work on ant rafts and towers. Particular attention is paid to rationalizing construction rates based upon individual behaviors and constraints of the ants. We also present preliminary work using plate-on-plate rheology of the ants, extracting the active components by comparison with the rheological behavior of a collection of dead ants.