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Cooling and aggregation in wet granulates ANNETTE ZIPPELIUS, STEPHAN ULRICH, TIMO ASPELMEIER, University of Goettingen, KLAUS ROELLER, AXEL FINGERLE, STEPHAN HERMINGHAUS, Max-Planck-Institute for Dynamics and Self-Organization — Wet granular materials are characterized by a defined bond energy in their particle interaction such that breaking a bond implies an irreversible loss of a fixed amount of energy. Associated with the bond energy is a nonequilibrium transition, setting in as the granular temperature falls below the bond energy. The subsequent aggregation of particles into clusters is shown to be a self-similar growth process with a cluster size distribution that obeys scaling. In the early phase of aggregation the clusters are fractals with $D_f = 2$, for later times we observe gelation. We use simple scaling arguments to derive the temperature decay in the early and late stages of cooling and verify our results with event-driven simulations.

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