

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Granular media in transformation: dynamics and structure

AYMERIC MERCERON, PIERRE JOP, ALBAN SAURET, SVI, CNRS/Saint-Gobain, SVI, CNRS/SAINT-GOBAIN TEAM — Sintering, glass melting and other industrially relevant processes turn batches of grains into continuous end products. Such processes involve complex and mostly misunderstood chemical and physical transformations of the granular packing. Affecting the contact network, physico-chemical reactions entail mechanical rearrangements. But such reorganizations may also trigger new potential reactions. Granular reactive systems are strongly coupled and need investigations for achieving industrial optimizations. This study is focused on how transformations appearing on its components affect the response of the granular packing. Inert brass disks and grains undergoing well-known transformations like volume decrease are mixed and then confined in a vertical 2D cell. While the system reacts, the granular packing is regularly photographed with a high-resolution camera. Events largely distributed both spatially and temporally occur around reactive grains. Thanks to image processing, this reorganization process is then analyzed. Spatial and temporal amplitudes of events are quantified as well as their local and global impacts on the granular structure.

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Date submitted: 31 Jul 2015

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