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Avalanche-like fluidization of a non-Brownian particle gel[1] AIKA KUROKAWA, Earthquake Research Institute, VALÉRIE VIDAL, ENS Lyon, KEI KURITA, Earthquake Research Institute, THIBAUT DIVOUX, CNRS, CRPP - Bordeaux, SÉBASTIEN MANNEVILLE, ENS Lyon — We report on the fluidization dynamics of an attractive gel composed of non-Brownian particles made of fused silica colloids. Extensive rheology coupled to ultrasonic velocimetry allows us to characterize the global stress response together with the local dynamics of the gel during shear startup experiments. In practice, after being rejuvenated by a preshear, the gel is left to age during a time t_w before being submitted to a constant shear rate $\dot{\gamma}$. We investigate in detail the effects of both t_w and $\dot{\gamma}$ on the fluidization dynamics and build a detailed state diagram of the gel response to shear startup flows. The gel may either display transient shear banding towards complete fluidization, or steady-state shear banding. In the former case, we unravel that the progressive fluidization occurs by successive steps that appear as peaks on the global stress relaxation signal. Flow imaging reveals that the shear band grows up to complete fluidization of the material by sudden avalanche-like events which are distributed heterogeneously along the vorticity direction and correlated to large peaks in the slip velocity at the moving wall.

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