

Description of Additional Supplementary Files

File name: Supplementary Movie 1

Description: An example video of sphere falling process (S3267). a, Images of the sphere recorded by contrast of X-ray absorption at a speed of 1000 frames per second. b, Integrated signal of X-ray absorption. A maximum denotes the sphere position. c, Sphere position as a function of time during an entire fall duration of less than 200 ms. The sphere falls with a constant velocity over more than 50% of the total distance of $\sim 500 \mu\text{m}$, which allows the determination of the melt viscosity.