Electronic Supplementary Material (ESI) for Nanoscale.
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Optical spectra of colloidal suspensions.

Figure S1 shows the evolution of the extinction spectra of S_1, S_2 and S_3 suspensions with the laser fluence. The longitudinal plasmon band of NRs is clearly observed at 835 nm, 560 nm, 730 nm on the spectra of S_1, S_2, S_3, respectively. The plasmon band of nearly spherical NPs is also observed at 525 nm on the spectra of S_3. The longitudinal plasmon band disappears after a laser exposure at 3.2 J.cm^{-2} for S_1 and S_3, and at 1.6 J.cm^{-2} for S_2. This suggests that NRs are completely transformed into spherical NPs whose plasmon band is clearly observed at 525 nm. The spectra of $S_{1,0.4}$, exhibits a broad band located at 700 nm. According to TEM images, these bands are attributed to ϕ-shaped NPs. The band located at 680 nm for $S_{3,0.4}$ and the broad absorption tail observed for $S_{3,0.8}$ are attributed to the presence of NRs which have an aspect ratio in the 0.5-0.9 range.

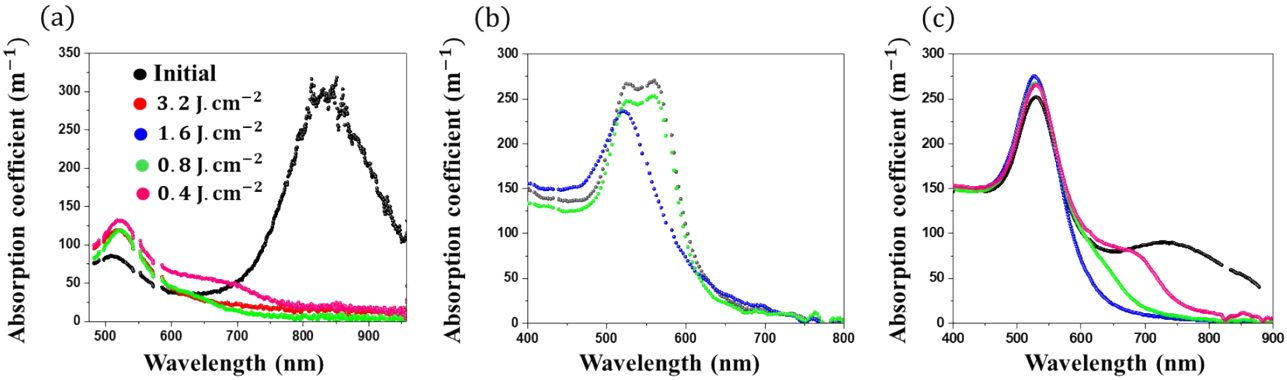

Fig. S1: Evolution of the absorption spectra with the laser fluence measured on S_1, S_2 and S_3.

Comparison between the Takami model and the MTM model

The MTM generalizes the classical Takami model by taking into account the convective and radiation losses, as well as the NP shape and orientation. Indeed, the classical Takami model is used to calculate the complete reshaping and fragmentation threshold of spherical NPs by neglecting losses. Figures S2 a-b compare the metastable phase diagram of spherical NPs simulated by the classical Takami model and the MTM model.

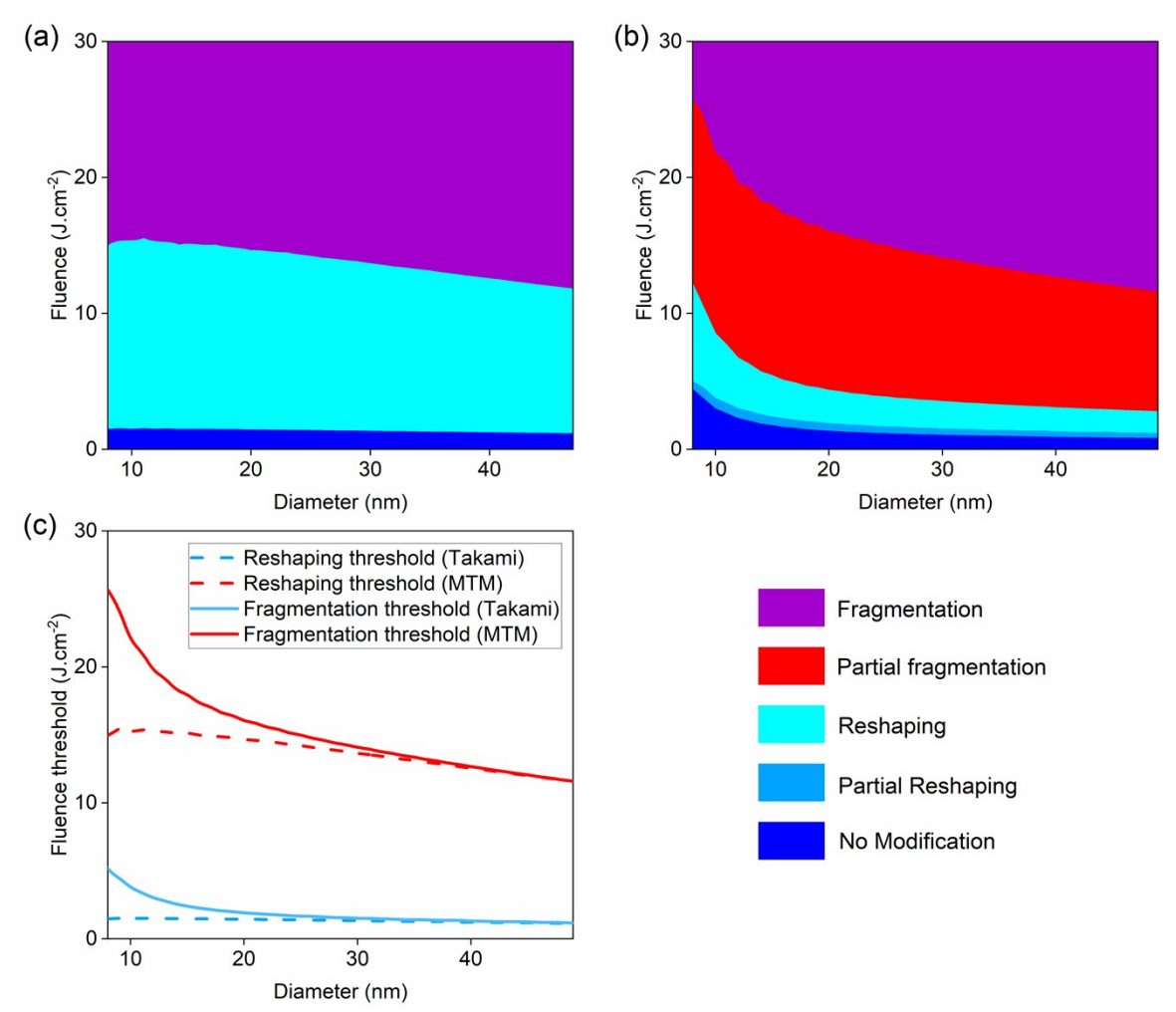

Fig. S2: (a)(b) Metastable phase diagrams of spherical Au NPs simulated from (a) the classical Takami model and (b) the MTM model. (c) Comparison between the complete reshaping and fragmentation thresholds of spherical NPs calculated from the classical Takami model and the MTM model.

The metastable phase diagram simulated from the MTM contains more information than those simulated from the classical Takami model. Indeed, the MTM can distinguish the partial reshaping from the total reshaping. It can also separate the partial and complete fragmentation processes. The fluence threshold of complete fragmentation and reshaping, calculated from the classical Takami model is smaller than those estimated from the MTM (Fig. S2c). This difference highlights the effect of convective and radiative losses. The losses effect is more pronounced for smaller NP. Indeed, the losses increase with the surface to volume ratio of NPs. For the higher diameter of spherical Au NPs, both models converge toward the same fluence thresholds.