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Supporting Information for

Laser-Induced Reshaping of Particles Aiming at Energy-Saving Applications

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1. Growth Mechanism of Spherical Particles by Laser Irradiation

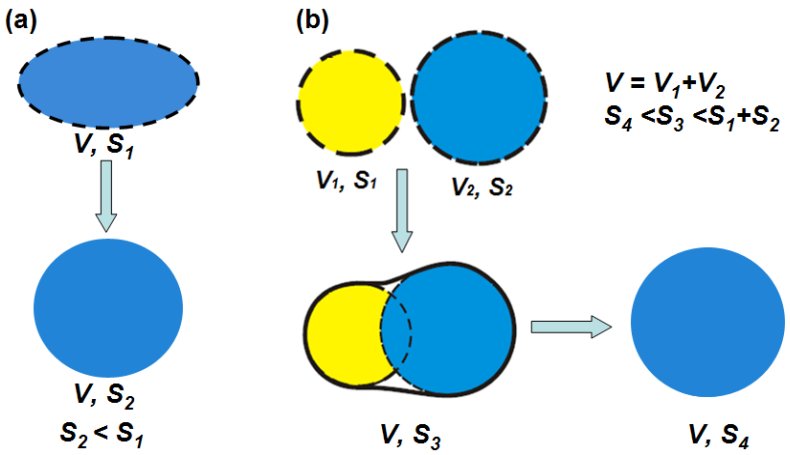

Figure S1. Schematic illustration of the proposed laser-simulated surface tension energy release growth process, (a) one particle spherizing, (b) two particles coalescence and then spherizing.

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2. The Coexistence of big spherical particles and nanoparticles after laser irradiation

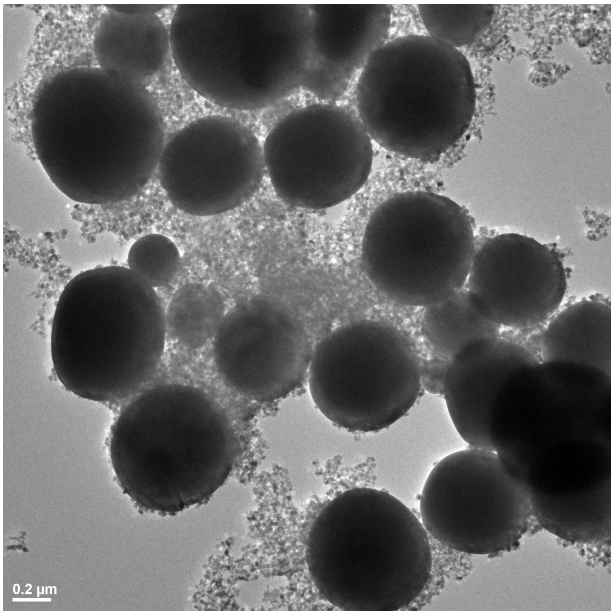

Figure S2. A transmission electron microscope image of ZnO big spherical particles and ultrafine nanoparticles produced under laser fluency of 1.2 J $pulse^{-1}cm^{-2}$.
The big spherical particles were produced by the laser-induced reshaping process and the nanoparticles were produced by laser fragmentation[R1] or laser ablation process.[R2]

R1. Mitsuo Kawasaki. Laser-Induced Fragmentative Decomposition of Fine CuO Powder in Acetone as Highly Productive Pathway to Cu and Cu_2O Nanoparticles *J. Phys. Chem C* 2011, **115**, 5165-5173.

R2. Stephan Barcikowski, Francisco Devesa, Kirsten Moldenhauer, Impact and structure of literature on nanoparticle generation by laser ablation in liquids, *J. Nanopart. Res.* 2009, **11**, 1883–1893.

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3. XRD results of the ZnO particles before and after laser irradiation

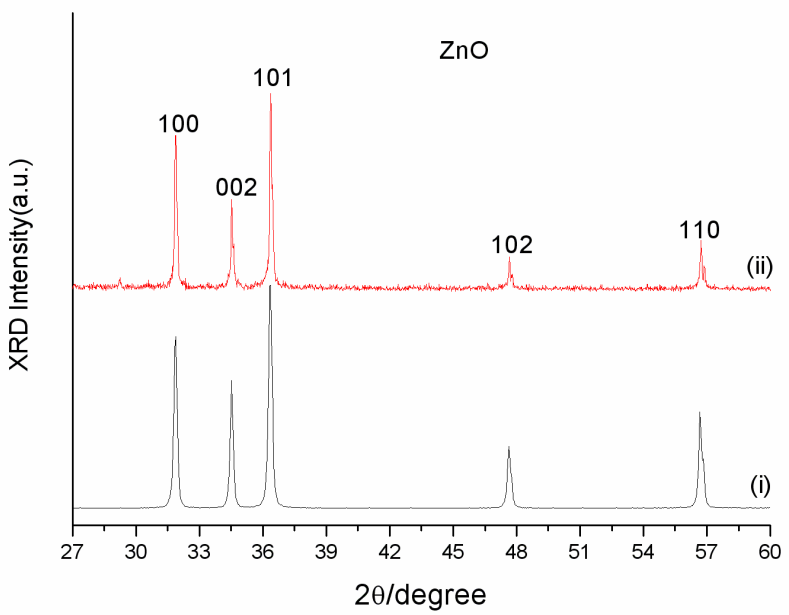

Figure S3. XRD patterns of the raw ZnO powders (i) and the corresponding spherical particles (ii) after laser irradiation under an energy fluency of 0.4 J $pulse^{-1}cm^{-2}$.

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4. The Friction-reduction Property of TiO_2 and CuO Spherical Particles as Lubricating Additives

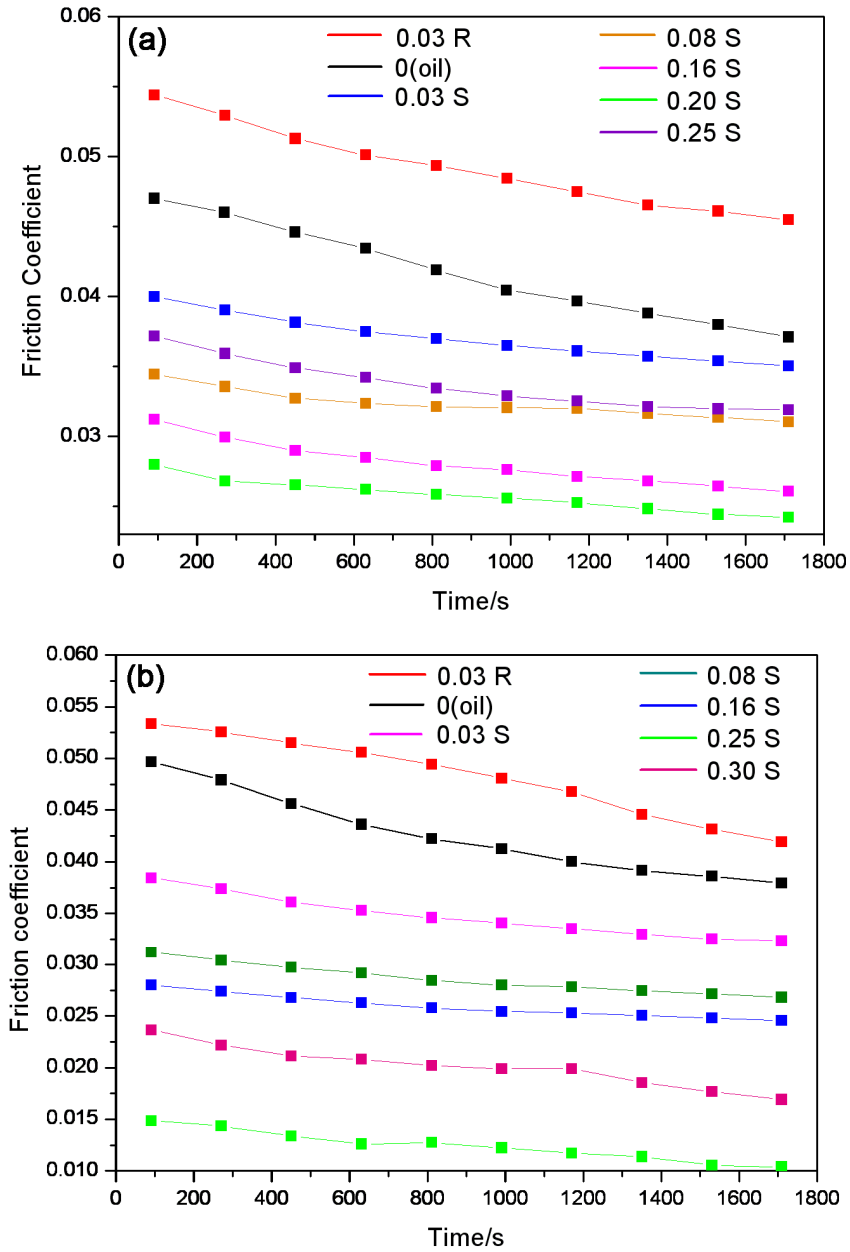

Figure S4. The friction coefficient variation with times for lubricating oil with different concentration of oxide particles measured with a thrust-ring tester. The mummers near the lines mean the mass concentration (wt%) of spherical particles in the lubricating oil. (a) TiO_2 spheres; (b) CuO spheres. R and S mean raw powders and spherical particles, respectively.