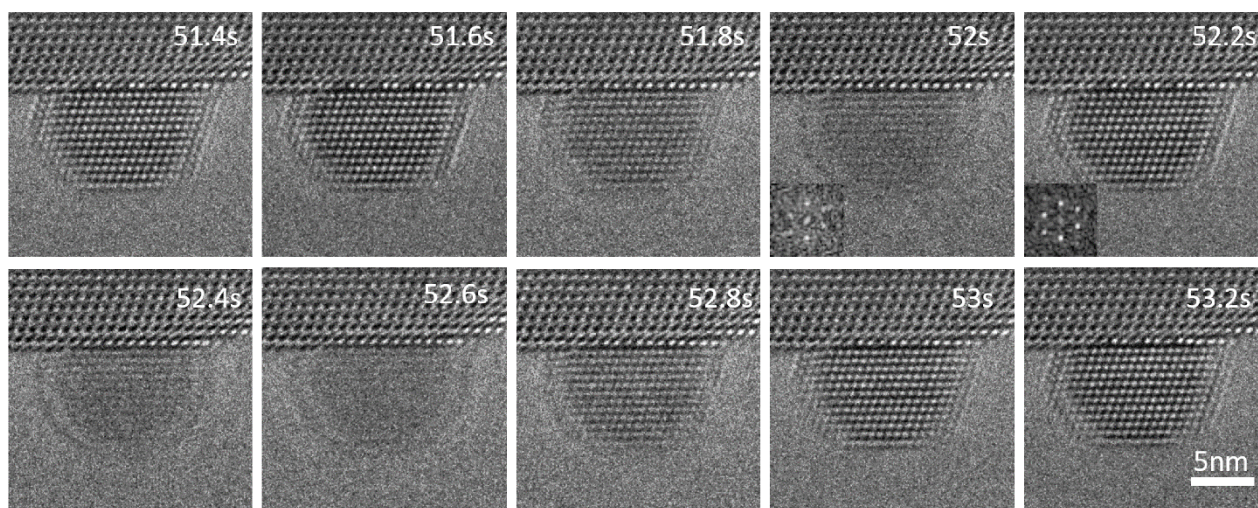


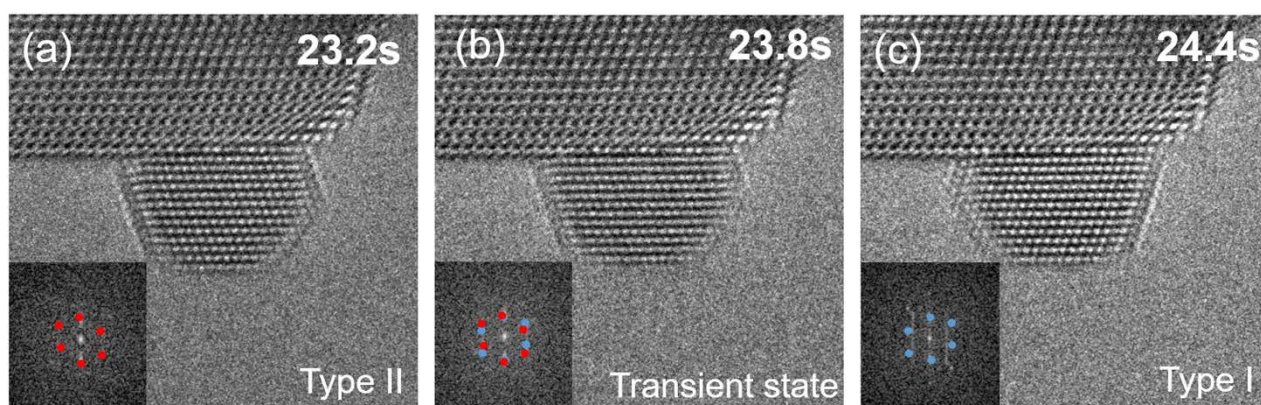
Nano Scale

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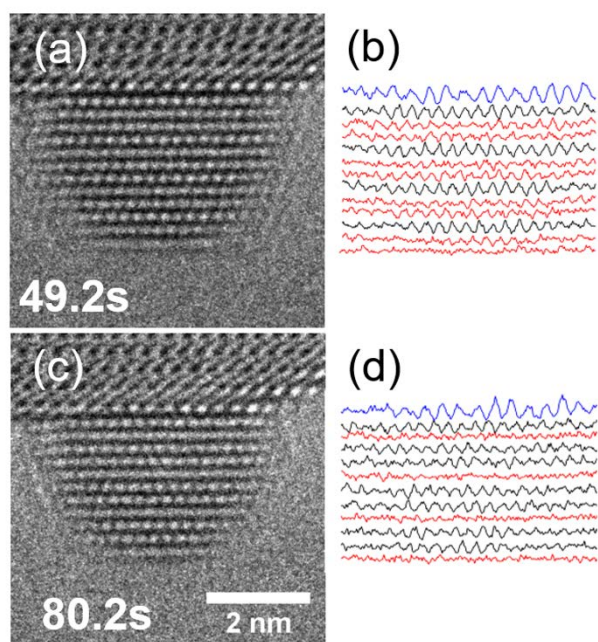
Supplementary Online Information



S 1 Image sequence of a Au nanoparticle at 973K in 4.5 Pa under 4.5 Pa O₂



S 2 Morphology evolution of an Au nanoparticle at 973K in 4.5 Pa O₂. a) Nanoparticle is in Type II, b) time-averaged overlapped state between Type I and Type II, c) nanoparticle in Type I. Observation time and FFT of the nanoparticle is shown on each frame.



S 3 Profile intensity of each layer of the nanoparticle of transient states

Table 1 Average residence time of each state

	Average residence time (s)	Standard deviation
Type I	2.53	2.68
Type II	0.73	0.87
Non-crystalline	1.09	0.96