Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supporting information for

Metallic Glass Ultrathin Films with Hierarchical Structure and their Dynamic and Thermodynamic Behaviors

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Movie S1 shows time-lapsed STM images illustrating the continuous shape change of the nanoparticle in Figure 2a.

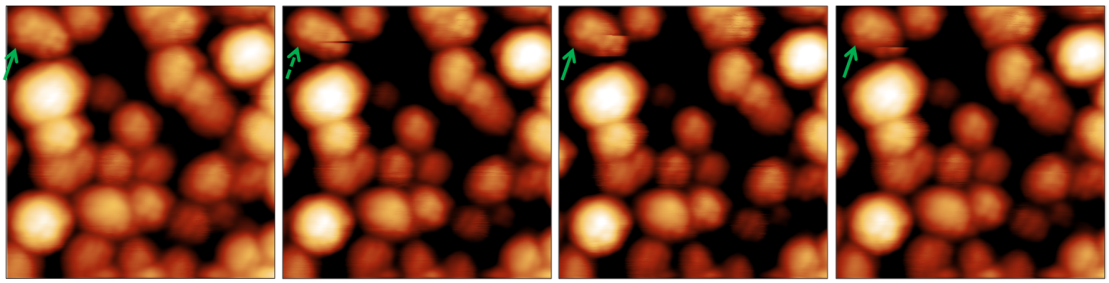

Figure S1. A series of consecutive pictures in Figure 2a reveals that there also exist other states which involve the diffusion of a smaller nanocluster hopping. The dashed-line arrow in the second picture indicates a different state from others.

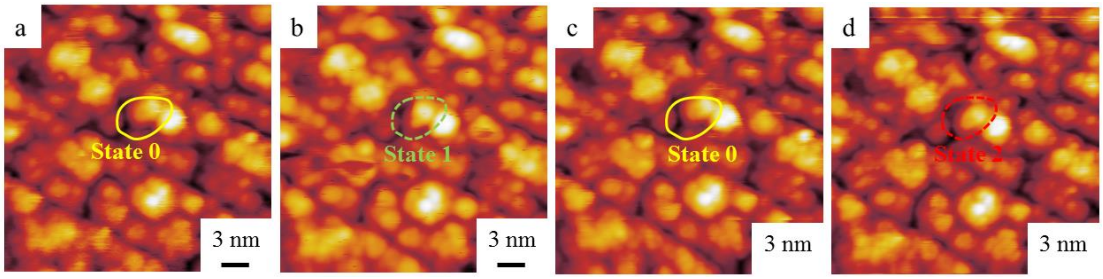

Figure S2. STM images showing the reversible dynamic behavior of some nanoparticles within $Fe_{85}Sc_{15}$ nanoglass ultrathin films on Au(111). (a, b, c and d)Four consecutive STM images showing three distinct states of one $Fe_{85}Sc_{15}$ nanoparticle on Au(111) as indicated by yellow lines, green dashed line and red dashed line. From state 0 to state 1 and further to state 2, there exists an apparent change in shapes of the indicated nanoparticle.

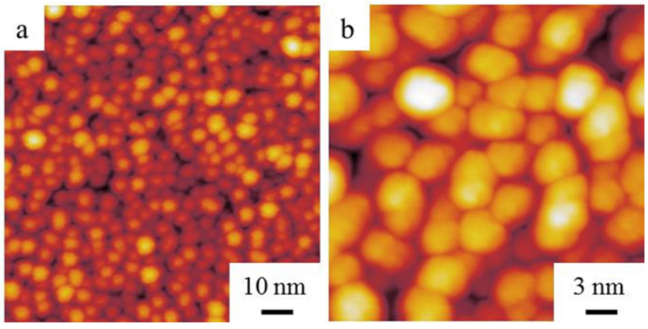

Figure S3. (a, b) STM image showing the FeSc nanoglass ultrathin films after anneal to 440 K. Compared with the nanoglass ultrathin film in Fig. 1(a)(b), there is no apparent change in shape and size of the nanoparticles.

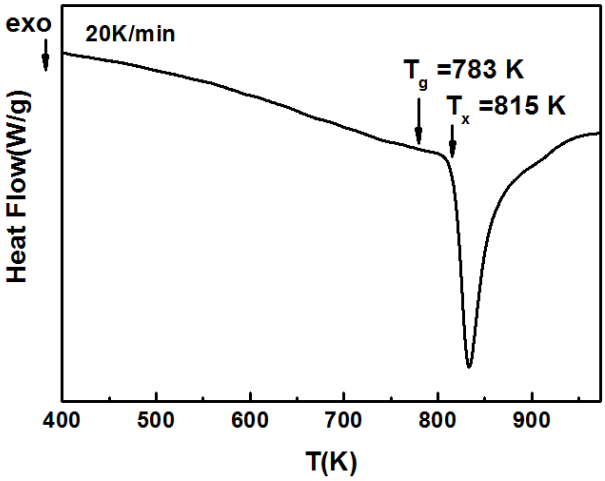

Figure S4. DSC curve shows the T_g (glass transition temperature) and T_x (onset temperature of crystallization) of bulk $Fe_{87}Sc_{13}$ metallic glass.

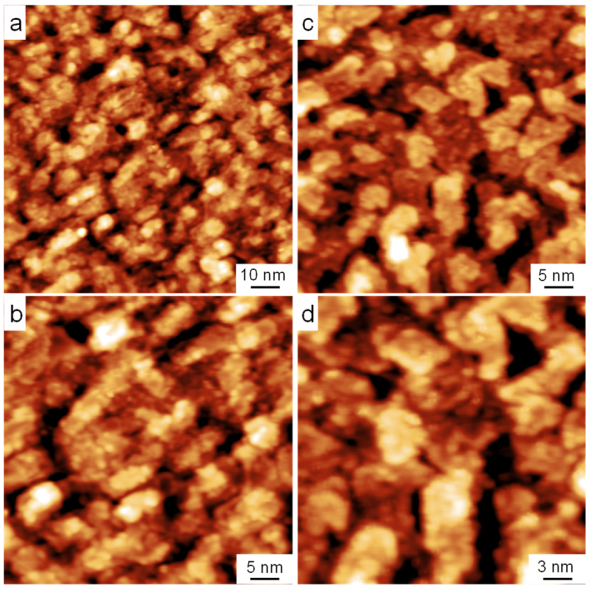

Figure S5. Structural evolution after annealing at temperatures between 520 K and 670 K. After anneal at 560 K (a,b), we observed longer stripes compared to that at 520 K in Figure 3c,d; and further anneal at 620 K (c,d) we find that the stripes has gradually converted to patches despite of disordered nanostructures.

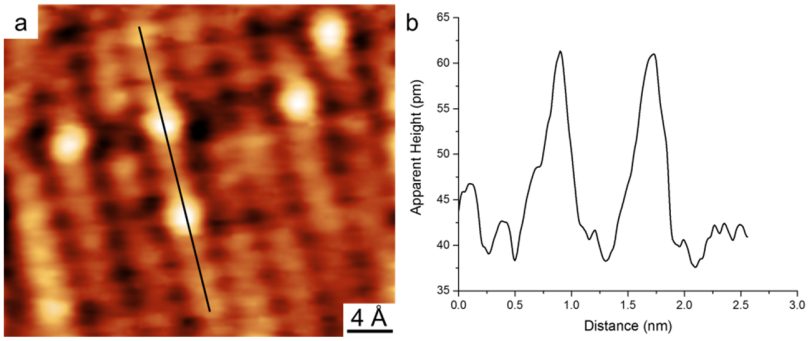

Figure S6. Line profiles on the crystalline structure of Fe-Sc marked in (a). The apparent height difference between the brighter spot and the darker one is around 22 pm.