Electron Nanodiffraction Reveals Surface Structure of Nanocrystals
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While surface reconstruction and bond length contraction is expected to be very important in nanocrystals, understanding what happens in nanoparticles has been hindered by a lack of suitable characterization techniques. A new method has been developed using a coherent beam of high-energy electrons to probe the surface structure of nanocrystals. The application of this technique to Au nanocrystals of 3–5 nm in diameter shows that surface atoms do contract, but the amount of contraction depends on the crystal facet. This behavior is markedly different from bulk crystalline surfaces and represents a new pattern of structural dynamics for nanocrystalline materials. The work represents a major breakthrough in structure determination using coherent diffraction of electrons.

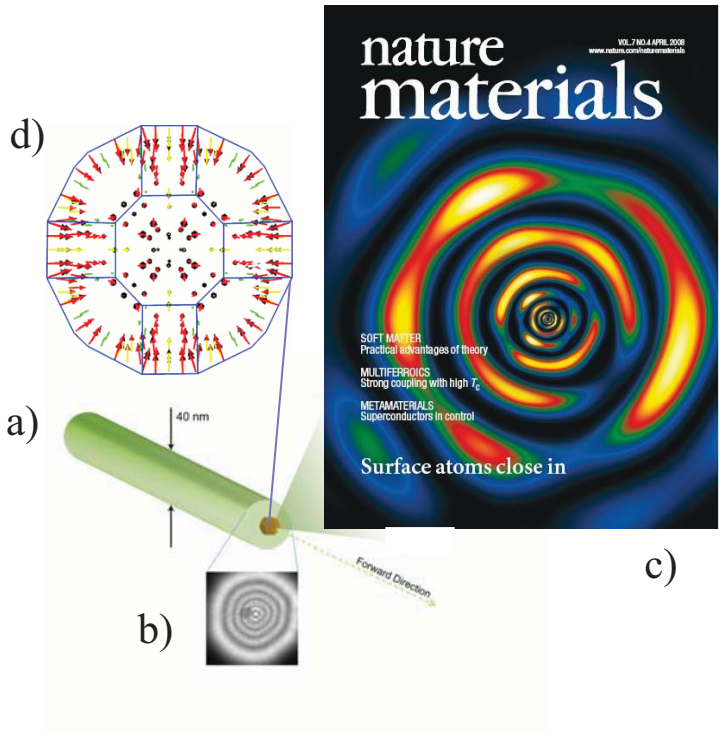

Figure 1(a) and (b) the 40 nm diameter coherent electron beam used to illuminate a single Au nanocrystal, (c) the journal cover and the diffraction patterns, and (d) the confirmed model of surface contraction.

References/Publication

Huang et al., *Nature Materials* **7**, 308 (2008)