

Ferroelectric Domain Decoration

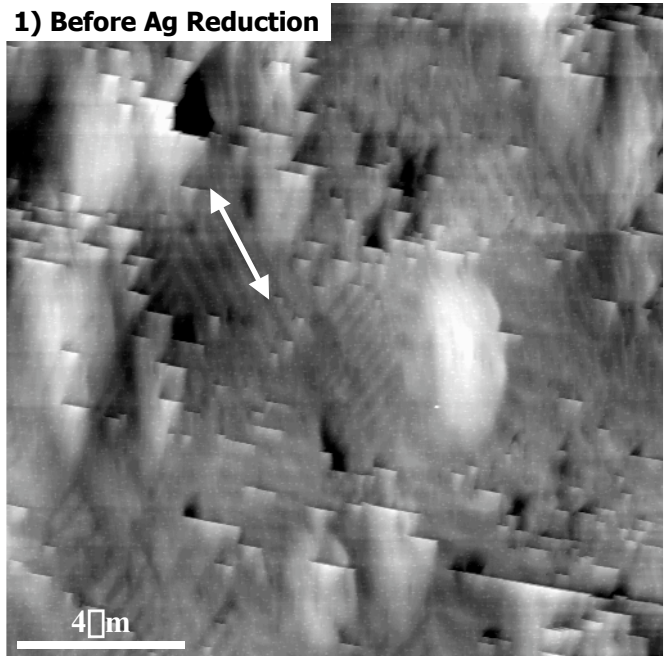
Atomic Force Microscopy (AFM) was used to study ferroelectric domains in polycrystalline BaTiO₃. The ceramic was prepared by conventional processing methods, polished flat and thermally grooved in air at 1200°C. Figure 1 is an AFM micrograph of a grain that had not fully faceted during the grooving treatment. There is also surface relief resulting from the presence of 90° ferroelectric domains, an example of which is denoted by an arrow parallel to a group of domains.

Silver metal was photochemically reduced ($\text{Ag}^+ \rightarrow \text{Ag}^0$) on the BaTiO₃ surface by immersing the sample in an aqueous AgNO₃ solution and irradiating for several seconds with a 300W Hg-lamp. Figure 2a shows the same grain after the Ag reduction while Figure 2b shows a higher resolution image of the area marked by the white box in 2a. Comparing the images, not all the domains visible in Fig.1 are covered with silver in Fig.2. The silver is therefore preferentially reduced only on certain domains and these domains are those whose polarization vector has a large component parallel to the surface normal.

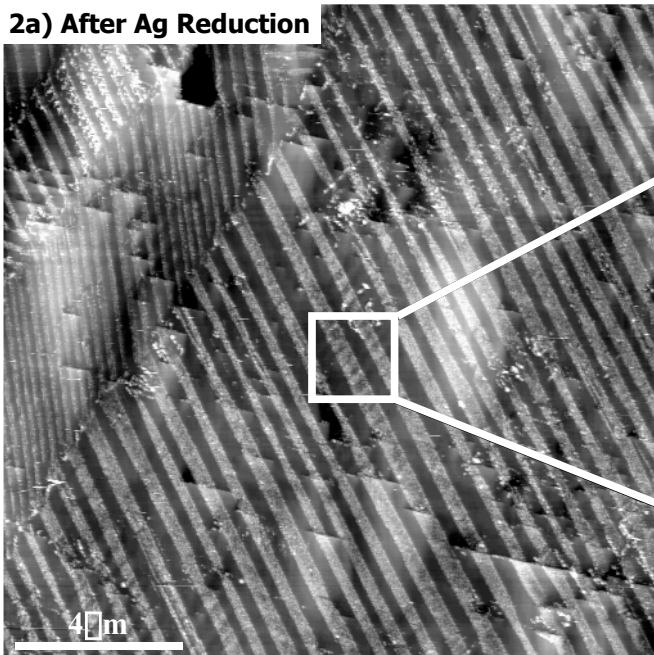
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Supported by NSF DMR 0072157

102nd Annual Meeting of the American Ceramic Society
2nd Place Ceramographic Competition 2000
Classification: Scanning Probe Microscopy

1) Before Ag Reduction



2a) After Ag Reduction



2b)

