High-resolution Study of the Ferroelectric $BaTiO_3$.	X3B1

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Among ferroelectric materials, $BaTiO_3$ is particularly interesting for its simple crystalline structure, good ferroelectric properties at ambient temperature, as well as chemical and mechanical stability, which facilitiates easy fabrication of ceramic samples. Both unpoled and poled $BaTiO_3$ pellets were studied by laboratory (Cu K_α) and synchrotron x-ray sources. We used a shorter wavelength (0.62 $\AA$) with a triple-axis configuration to probe deeper below the surface, with superior resolution to the laboratory measurements.

Lineshape analysis showed that the crystalline structure, particularly lattice parameters, remain unchanged upon poling. A $\sin^2\psi$ analysis of peak shift (not shown) indicates that no measureable change of elastic strain occurs upon poling. This indicates that poling may have induced excessive strain which was relieved by microcracking, or that a majority of domains reverse the orientation.

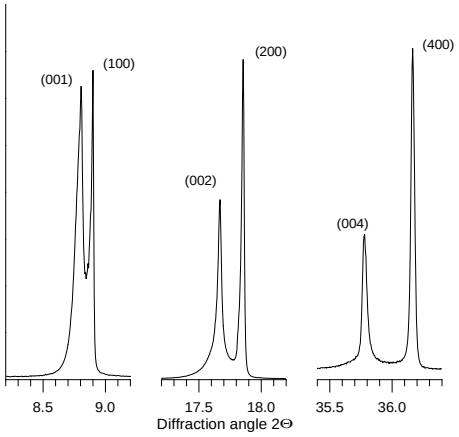

Figure 1.