Synthesis of single crystalline multiferroic $BiFeO_3$ films

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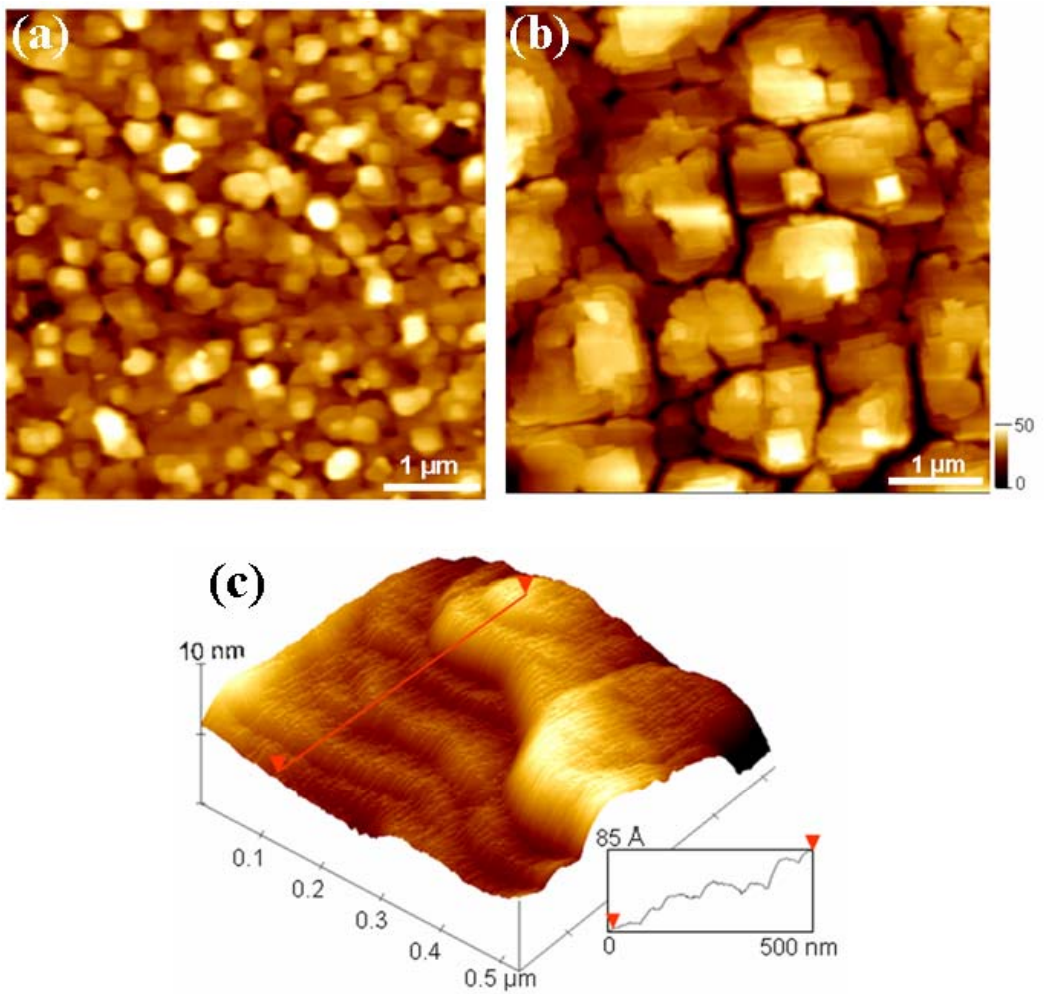

$BiFeO_3$ is a room temperature multiferroic material widely pursued for various applications. Because of synthesis difficulties, bulk single crystals of $BiFeO_3$ are not available, and thus, intrinsic single crystal properties of $BiFeO_3$ are not understood. We have succeeded in synthesizing the film version of single crystals using the novel flux mediated epitaxy (FME) using the combinatorial laser MBE. Substantially enhanced dielectric properties compared to ordinary thin films were observed.

(a) AFM image of standard $BiFeO_3$ film showing small grains. (b) Our FME $BiFeO_3$ film shows 10 times larger grains with much enhanced dielectric properties. (c) AFM detail shows unitcell order steps in our films optimized by combinatorial LMBE