Title:	Nano-electrical domain writing for oxide electronics
Authors:	Mishra, Shivam (/jspui/browse?type=author&value=Mishra%2C+Shivam)
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Abstract:	In this paper, we report writing of localized nano-electrical domains using atomic force microscopy tip on the surface of different kinds of (bulk, surface and interface) conducting oxide material namely, SrTiO3. The origin of conductivity in these samples has different mechanisms. Our experimental observations present a unified picture of charge writing process and clarifies the dynamics of accumulation/depletion of charge in the samples. We have found that free mobile carriers are a pre-requisite for writing electrical domains. Charge writing capability as well as diffusion of charge from the written region are found to show strong dependence on the mobility of the carriers. Through a control experiment, we have demonstrated that by introducing defects (oxygen vacancies), stability of the written pattern can be increased. Our results provide a guidance to achieve higher performance in oxide based nano-electrical memory devices.
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