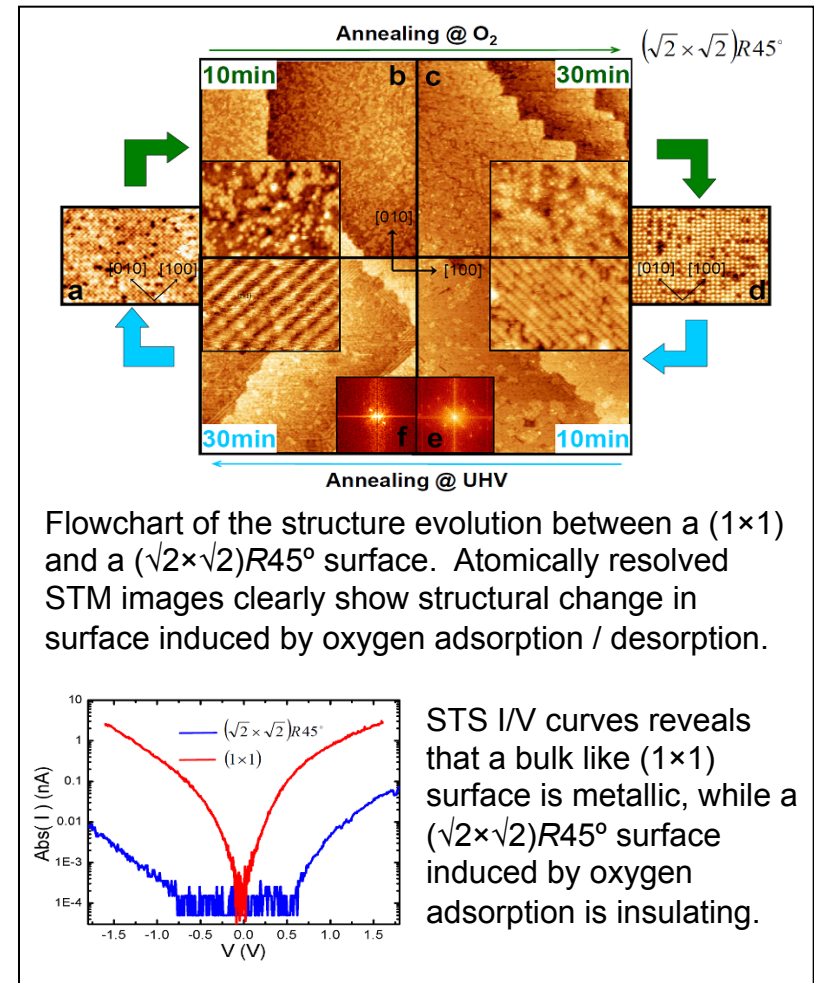


Tunable Surface Metallicity: Extrinsic Oxygen Doping: $\text{La}_{1-x}\text{Ca}_x\text{MnO}_3$

**Kenji Fuchigami, E. Ward Plummer (University of Tennessee)
& Jian Shen (Oak Ridge National Lab)**

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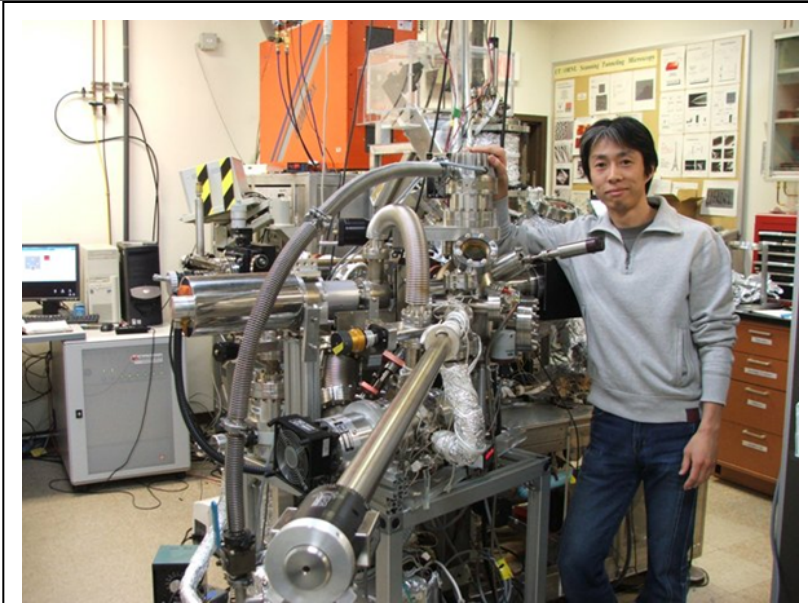
Perovskite manganites are complex systems in which the structural, electronic, and magnetic properties are strongly coupled. Creating a surface provides a controlled way to disturb the coupled system by breaking the symmetry without changing the stoichiometry, which may lead to completely new physical properties. We show that oxygen adsorption / desorption can change a surface structure of LaCaMnO_3 (LCMO) back and forth between (1×1) (metallic) and $(\sqrt{2} \times \sqrt{2})R45^\circ$ (insulating). Interestingly, the conductivity of the surface is also strongly influenced by existence of oxygen in the surface. Tunable metallicity of LCMO surface is clearly demonstrated in this study.



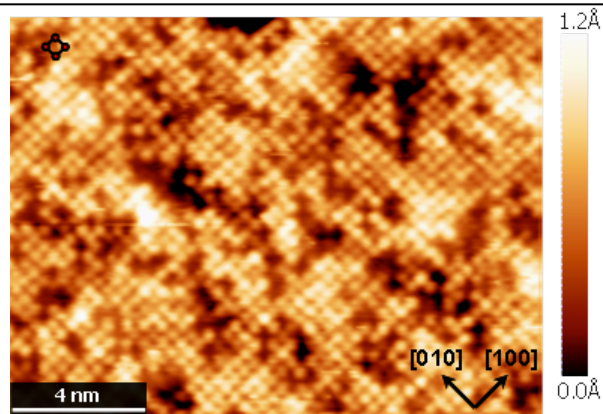
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Studying at the University of Tennessee and Oak Ridge National Laboratory

Kenji Fuchigami DMR-0451163 (funded jointly by NSF and DOE)



Kenji Fuchigami (top picture), a researcher at IHI Corporation (Yokohama, Japan) has been on leave from his company from 2005 to 2008 to complete his Ph.D degree. At IHI, he has engaged in many research and development projects regarding novel surface treatment and functionalization techniques. It became clear that understanding and controlling a surface is important to achieve significant advances in product performance. The purpose of the stay in Tennessee was to obtain a high level of knowledge and experience with techniques used by surface scientists in order to open up an opportunity to apply it to the industrial field. The international contacts he made at UTK and ORNL will also be very valuable assets for him with anticipating future collaboration.



Atomically resolved STM image of CMR manganite surface.