

12th International Workshop on Oxide Electronics
October 2-5, 2005
Chatham Bars Inn, Chatham, Cape Cod, Massachusetts

Sunday, October 2

8:00-10:00 pm WELCOMING RECEPTION, South Lounge – Join us for an opportunity to network with other Workshop participants prior to the start of the program. Cheese and crackers will be served, cash bar.

Monday, October 3

7:30-8:30 am CONTINENTAL BREAKFAST, Monomoy Room

8:30-8:45 am Welcoming remarks, Monomoy Room

ORAL SESSION 1: High- T_c superconductors

8:45-11:45 am

Chair: Jean-Marc Triscone / Piero Martinoli

8:45-9:15 **Momentum resolved spectroscopic studies of cuprate superconductors**
J. Mesot (invited), ETHZ/PSI

9:15-9:45 **Electrostatic modulation of the superfluid density of ultrathin superconducting $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ films in the underdoped regime**
P. Martinoli (invited), Neuchâtel

9:45-10:00 **Macroscopic quantum tunneling in d-wave Josephson junctions**
T. Bauch, Chalmers

10:00-10:15 **Evidence for quantum criticality in the n-doped cuprates**
R. Greene, Maryland

10:15-10:45 BREAK

10:45-11:15 **Electromagnetic, atomic-structure and chemistry changes induced by Ca-doping of low-angle YBCO grain boundaries**
D. Larbalestier (invited), Wisconsin

11:15-11:30 **Direct observation of cooperative doping mechanisms at grain boundaries in Ca-doped $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$**
R. Klie, Brookhaven

11:30-11:45 **Spin-polarized quasiparticle injection into YBCO thin films**
H. Habermeier, Max-Planck Institute

12:00-1:30 pm LUNCH, Main Dining Room

ORAL SESSION 2: Ferroelectrics I

1:30-5:00 pm

Chair: Nicola Spaldin / Darrell Schlom

- 1:30-2:00 **TBA**
C.-B. Eom (invited), Wisconsin
- 2:00-2:15 **Inducing ferroelectricity in SrTiO₃ using strain**
M. Biegalski, Penn State
- 2:15-2:45 **Direct evidence for ferroelectricity in ultrathin PbTiO₃ films by x-ray photoelectron diffraction**
L. Despont (invited), Neuchâtel
- 2:45-3:15 ***In situ* synchrotron x-ray studies of synthesis and phase behavior of epitaxial Pb(Zr,Ti)O₃ thin films**
S. Streiffer (invited), Argonne
- 3:15-3:45 BREAK
- 3:45-4:15 **Progress in magnetoelectric multiferroics**
N. Spaldin (invited), UCSB
- 4:15-4:45 **Probing the magnetoelectric coupling in complex-oxide heterostructures**
F. Zavaliche (invited), UC Berkeley
- 4:45-5:00 **Nonlinear dielectric and piezoelectric response in ferroelectric thin films**
S. Trolrier-McKinstry, Penn State

POSTER SESSION P1

Ferroelectrics, superconductors, CMR oxides, multiferroics, interfaces, and electronic correlations

8:00-10:00 pm

Alden, Eldredge and Monomoy Rooms

(list of posters at end of workshop program)

Tuesday, October 4

7:30-8:30 am CONTINENTAL BREAKFAST, Monomoy Room

ORAL SESSION 3: Electronic Correlations

8:30-9:45 am

Chair: Masashi Kawasaki

8:30-9:00 **Theory of surface and interface phenomena in correlated electron systems**
A. Millis (invited), Columbia

9:00-9:30 **Interface atomic and electronic reconstruction in response to the polarity discontinuity between LaAlO₃ and SrTiO₃**
H. Hwang (invited), Tokyo

9:30-9:45 **Photoemission study of LaTiO₃/SrTiO₃ interfaces**
M. Takizawa, Tokyo

9:45-10:15 BREAK

ORAL SESSION 4: Dilute magnetic semiconductors

10:15-11:30 am

Chair: David Norton

10:15-10:45 **Magnetism in dilute ferromagnetic oxides and d^0 ferromagnetism**
M. Coey (invited), Trinity College

10:45-11:00 **New insights into the mechanism(s) of magnetism in doped TiO₂ anatase**
S. Chambers, Pacific Northwest

11:00-11:15 **Ferromagnetism in anatase TiO₂ co-doped with Co and Nb**
T. Hitosugi, Tokyo

11:15-11:30 **Ferromagnetism, transport, defect states and electric field modulation of ferromagnetism in high temperature grown cobalt doped TiO₂ and the F-center polaron percolation model**
S. Ogale, Maryland

11:45 am-1:15 pm LUNCH, Main Dining Room

POSTER SESSION P2

Semiconductors, dielectrics, magnetic oxides, Schottky junctions, device applications, and instrumentation

1:15-3:15 pm

Alden, Eldredge and Monomoy Rooms

(list of posters at end of workshop program)

ORAL SESSION 5: CMR and magnetic oxides

3:30-5:00 pm

Chair: Rudolf Gross

- 3:30-3:45 **Probing spin correlations with phonons in the strongly frustrated magnet ZnCr_2O_4**
H. Drew, Maryland
- 3:45-4:00 **Probing the magnetic moment of W in the double perovskite Sr_2CrWO_6**
P. Majewski, Walther Meissner Institute
- 4:00-4:15 **Phase control of $\text{LaMnO}_3/\text{SrMnO}_3$ Interface**
H. Yamada, AIST
- 4:15-4:30 **Multi-scale inhomogeneities observed by scanning tunneling spectroscopy on $\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3$ thin films**
R. Di Capua, Naples
- 4:30-4:45 **Quantum effects on the electrical transport in metallic oxides**
G. Herranz, Thales
- 4:45-5:00 **Spin filtering with perovskite and spinel oxides**
A. Barthelemy, Thales
- 5:00-5:30 BREAK

ORAL SESSION 6: Ferroelectrics II

5:30-6:45 pm

Chair: Chang-Beom Eom

- 5:30-6:00 **Artificial superlattices for oxide electronics**
D. Blank (invited), Twente
- 6:00-6:15 **Controlling ferroelectricity in $\text{PbTiO}_3/\text{SrTiO}_3$ superlattices**
M. Dawber, Geneva
- 6:15-6:30 **Artificial oxide superlattices with designed-in structures and properties**
H.N. Lee, Oak Ridge
- 6:30-6:45 **Fundamental thickness limits of ultrathin ferroelectric films**
T. Noh, Seoul
- 7:15-10:00 pm **BANQUET (Lobster Bake), Beach House Grill**

Wednesday, October 5

7:30-8:30 am CONTINENTAL BREAKFAST, Monomoy Room

ORAL SESSION 7: Device applications / Field effect / Resistive switching

8:30 am-12:00 pm

Chair: Mikk Lippmaa / Hideomi Koinuma

- 8:30-9:00 **Inelastic electron tunneling spectroscopy (IETS) study of high-k oxides**
T.P. Ma (invited), Yale
- 9:00-9:15 **Field-effect transistor based on TiO₂ channel**
M. Katayama, Tokyo Institute of Technology
- 9:15-9:30 **Interface design for SrTiO₃ field-effect transistors**
K. Shibuya, Tokyo
- 9:30-9:45 **Electrical properties of ferromagnetic oxide nano-channels prepared by atomic force microscopy**
Y. Yanagisawa, Osaka
- 9:45-10:15 BREAK
- 10:15-10:45 **ZnO light emitting diode realized by combinatorial approach**
M. Kawasaki (invited), Tohoku
- 10:45-11:00 **Nanostructured VO₂ particle arrays as active elements for photonic devices**
R. Lopez, Vanderbilt
- 11:00-11:30 **Giant room-temperature magnetoresistance in magnetic tunnel junctions with crystalline MgO(001) barrier**
S. Yuasa (invited), AIST
- 11:30-11:45 **Giant planar Hall effect**
X. Hong, Yale
- 11:45-12:00 **Nonvolatile resistance switching induced by electric field at perovskite-oxide heterointerfaces**
A. Sawa, AIST
- 12:00-12:05 Concluding Remarks

END OF WORKSHOP

Poster Session P1 (Monday 8:00-10:00 pm)

List of Posters (45)

Ferroelectrics, superconductors, CMR oxides, multiferroics, interfaces, and electronic correlations

P1 H. Christen (Oak Ridge)

Electronic configurations at perovskite interfaces probed by atomic-scale electron-energy loss spectroscopy

P2 O. Dahl (NTNU)

Optical and pyroelectric characterization of thin ferroelectric films

P3 R. Das (Wisconsin)

Structural and ferroelectric properties of epitaxial BiFeO₃ thin films

P4 R. Dittman (FZ-Juelich)

Impact of electrode interfaces on epitaxial Ba_{0.7}Sr_{0.3}TiO₃ thin film capacitors

P5 A. Doi (Osaka)

Dielectric properties and crystal structures of Pb free ferroelectrics: Ba(Hf_xTi_{1-x})O₃, Ba(Zr_xTi_{1-x})O₃

P6 C. Folkman (Wisconsin)

Control of polarization direction in strain engineered epitaxial BaTiO₃ thin-films

P7 D. Fong (Argonne)

Environmental control of ferroelectric thin film behavior

P8 C. Harnagea (INRS)

Ferroelectric mesoscopic structures and their domain structure

P9 G. Hassink (Twente)

A two-pronged attack on the magnetoelectric interaction in BiMnO₃

P10 Y. Hotta (Tokyo)

Electronic structure of LaVO₃/LaAlO₃ interfaces and multilayers

P11 J.U. Huh (Stanford)

A novel approach to growth of YBCO films: oxygen driven nucleation and crystallization assisted by liquid

P12 M. Hujiben (Twente)

Interface conduction in SrTiO₃-LaAlO₃ multilayers

P13 D.H. Kim (Oak Ridge)

Strain states, charge ordering, and chemical inhomogeneity in Bi_{1-x}Ca_xMnO₃ epitaxial thin films

P14 Y.S. Kim (SNU)

Control of the c-axis lattice constant ultra-thin BaTiO₃ films and changes in their ferroelectric properties

P15 Y. Krockenberger (Max-Planck Institute)

Growth and properties of thin Na_xCoO₂ films over a wide doping range

P16 C. Lichtensteiger (Geneva)

Ferroelectricity in ultrathin PbTiO₃ films

P17 M. Lippmaa (Tokyo)

Metallic LaTiO₃ nanowire arrays embedded in SrTiO₃

P18 M. Mathews (Twente)

Magnetic anisotropy in La_{0.67}Sr_{0.33}MnO₃ thin films, nanowires, and nanodots

P19 D. Matthey (Geneva)

Electric field effect experiments in thin NdBa₂Cu₃O_{7-d} films

P20 F. Miletto Granozio (INFN)

Effects of strain in LSMO epitaxial films

P21 M. Murakami (Maryland)

Synthesis and characterization of multiferroic Bi(Fe,Cr,Mn)O₃ thin films

P22 H. Nakamura (Tokyo)

Electrostatic carrier tuning in perovskite single crystals

P23 T. Nobis (Leipzig)

Exchange polarization coupling in wurtzite-perovskite interfaces: new concepts for electronic device heterostructures

P24 A. Ohtomo (Tohoku)

Electronic transport properties in perovskite band-insulator solid-solutions

P25 S. Okamoto (Columbia)

Theory of correlated electron interfaces

P26 P. Paruch (Geneva)

Nanoscope studies of ferroelectric domain walls in epitaxial perovskite thin films

P27 N. Pavlenko (Augsburg)

Electric field effect in strongly correlated d-wave superconducting film

P28 A. Posadas (Yale)

Epitaxial growth of multiferroic YMnO₃ on GaN

P29 R. Rairigh (Florida)

Colossal magnetocapacitance and surface magnetism in mixed phase manganites

P30 M. Salluzzo (INFN)

Thickness effect on the structure and superconductivity of Nd_{1.2}Ba_{1.8}Cu₃O_z epitaxial films

P31 A.K. Sarin Kumar (NTNU)

Interaction between surface acoustic waves and ferroelectric domain walls investigated with a phase sensitive laser probe

P32 J. Schubert (FZ-Juelich)

Ferroelectric Ca_xBa_{1-x}Nb₂O₆ thin films prepared by pulsed laser deposition

P33 A. Soukiassian (Penn State)

Epitaxial growth of BaTiO₃/SrTiO₃ and BaO/SrTiO₃ superlattices for phonon confinement

P34 N. Stucki (Geneva)

Domain dynamics in ferroelectric multilayers

P35 A. Sushkov (Maryland)

Frequency dependence of dielectric anomalies in multiferroics

P36 K. Takahashi (Geneva)

Local electrostatic modulation of Nb-doped SrTiO₃ superconducting films

P37 A. Venimadhav (Penn State)

Structural and transport properties of epitaxial Na_xCoO₂ thin films for thermal electric power application

P38 H. Wadati (Tokyo)

In-situ angle-resolved photoemission study of La_{1-x}Sr_xFeO₃ epitaxial thin films

P39 M. Warusawithana (Penn State)

New electronic properties in strained dielectric superlattices

P40 D. Winkler (Chalmers)

Growth and characterization of NdBa₂Cu₃O₇ thin films on vicinal SrTiO₃ substrates

P41 X. Xi (Penn State)

Ferroelectric BaTiO₃/SrTiO₃ superlattices studied by ultraviolet Raman spectroscopy

P42 J.B. Yau (Yale)

Anisotropic magnetoresistance in colossal magnetoresistive La_{1-x}Sr_xMnO₃ thin films

P43 J. Yu (SNU)

Defect-induced electronic structure of NiO: a first-principles study

P44 K.S. Yun (NIMS)

Electromagnetic properties of grain boundary Josephson junctions using high quality NdBa₂Cu₃O_{7-y} thin films grown by tri-phase epitaxy

P45 M. Zurbuchen (NIST)

Designer multiferroics

Poster Session P2 (Tuesday 1:15-3:15 pm)

List of Posters (48)

Semiconductors, dielectrics, magnetic oxides, Schottky junctions, device applications, and instrumentation

P46 J. Barnett (Sematech)

High resolution physical characterization of annealed Hf based gate dielectric thin films on Si (100)

P47 E. Bellingeri (Genova)

ZnO/SrTiO₃ based transparent field effect transistor

P48 G. Braunstein (Central Florida)

Acceptor formation by ion implantation of nitrogen into ZnO

P49 R. Bresnahan (Veeco)

Components for production molecular beam epitaxy growth of oxide-based material

P50 D. Bulajic (INFM-TASC)

In situ synchrotron studies of complex oxides at Elettra

P51 I.W. Chen (U-Penn)

Resistance-switching oxide thin film devices

P52 R. Das (Wisconsin)

Epitaxial growth and characterization of rare-earth scandate templates

P53 M. Dekkers (Twente)

PLD growth of indium tin oxide at room temperature on polymer substrates

P54 S. Dhar (Maryland)

Evolution of thermal induced damage and its recovery in ZnO single crystal investigated by elastic resonant ion channeling

P55 S. Dhar (Maryland)

Epitaxial growth of monoclinic HfO₂ thin films on YSZ and Si substrates by pulsed laser deposition

P56 L. Edge (Penn State)

Epitaxial La₂O₃, Sc₂O₃, and LaScO₃ on silicon for alternative gate dielectric applications

P57 R. Gross (Walther-Meissner Institute)

Large room temperature TMR effect in tunnel junctions based on magnetite

P58 T. Heeg (FZ-Juelich)

Rare-earth scandate multi-layer thin films prepared by pulsed laser deposition

P59 G. Herranz (Thales)

Growth modes and self-organization in the epitaxy of ferromagnetic SrRuO₃ on SrTiO₃ (001)

P60 G. Herranz (Thales)

Epitaxial stabilization of orthorhombic YMnO₃ thin films: crystal structure and magnetic properties

P61 Y. Hikita (Tokyo)

Effect of Mn impurity doping in SrRuO₃/Nb:SrTiO₃(100) Schottky junctions

P62 S. Hullavarad (Maryland)

Effect of Mg on crystal structure of ZnO and optoelectronic properties of MgZnO alloys and their applications

P63 S. Hullavarad (Maryland)

Low leakage current transport in pulsed laser deposited Ni/HfO₂/SiC MIS devices

P64 G. Koster (Stanford)

Defect chemistry and properties of SrRuO₃ epitaxial thin films

P65 G. Koster (Stanford)

The effect of low energy Ar⁺ ion bombardment on epitaxy and oxidation of thin films of CuO_x

P66 O. Korostynska (Limerick)

The sensitivity of metal oxide thick films to gamma radiation depending on their molecular and atomic weight

P67 Y. Kozuka (Tokyo)

Rectifying behavior in the junction of NdNiO₃ and n-type SrTiO₃ and study of electronic state at the interface

P68 D. Kundaliya (Maryland)

Temperature dependent Schottky diode characteristics of Fe₃O₄/Nb(0.05, 0.5%):SrTiO₃ oxides heterostructure

P69 H.N. Lee (Oak Ridge)

Morphological instability of conducting SrRuO₃ during step-flow growth

P70 Y.J. Li (Florida)

Properties of phosphorus-doped p-type (Zn,Mg)O grown by pulsed laser deposition

P71 P. Majewski (Walther Meissner Institute)

Doping and magnetotransport in Sr₂CrWO₆ thin films

P72 F. Miletto Granozio (INFN)

Development of a new apparatus for oxide thin film deposition and analysis

P73 K.-W. Nielsen (Walther-Meissner Institute)

Room temperature ferromagnetism in cobalt-doped ZnO

P74 T. Nobis (Leipzig)

Analysis of optical modes in ZnO nanoresonators

P75 T. Nobis (Leipzig)

ZnO thin films grown by PLD on 3C-SiC buffered Si and on 6H-SiC single crystals

P76 T. Nobis (Leipzig)

Impurity levels in ZnTMO (TM=Co, Mn, Ti) thin films investigated by deep level transient spectroscopy

P77 T. Ohnishi (Tokyo)

Understanding of the pulsed laser deposition and growth of defect-free SrTiO₃ thin films

P78 L. Pellegrino (Osaka)

Fabrication of Mn-doped Fe_3O_4 nano-channel structures by AFM lithography and applications to nano FET devices

P79 Pignolet (INRS)

Multilayered mesostructures of functional complex oxides by pulsed laser deposition shadow-masking

P80 A. Prigiobbo (INFM)

Field effect experiments on reduced SrTiO_3 single crystals surfaces

P81 D. Pugel (Maryland)

Thermal annealing evolution of surface and bulk properties of single crystal ZnO

P82 D. Pugel (Maryland)

Oxygen dependent phosphorous bonding in low temperature RF sputtered ZnO thin films

P83 W. Ramadan (Maryland)

A comparative study of growth and properties of Nb doped SrTiO_3 films on SrTiO_3 (001), LaAlO_3 (001), MgAl_2O_4 (001) and Y-ZrO₂ (110) substrates: Role of substrate induced strain effects

P84 W. Ramadan (Maryland)

Niobium concentration dependence of the non-linear current-voltage characteristics of hetero-epitaxial junction between $\text{Y}_1\text{Ba}_2\text{Cu}_3\text{O}_{7-d}$ and (001) Nb: SrTiO_3 : Realization of highly rectifying characteristics

P85 H. Saeki (Osaka)

Magnetic and transport properties of (Zn,Co)O thin films

P86 H. Sato (AIST)

Fabrication of $\text{La}_{0.6}\text{Sr}_{0.4}\text{MnO}_3/\text{La}_{0.3}\text{Sr}_{0.7}\text{Al}_{0.65}\text{Ta}_{0.35}\text{O}_3/\text{La}_{0.6}\text{Sr}_{0.4}\text{MnO}_3$ spin tunnel junctions using ramp geometry

P87 M. Seki (Osaka)

Photocontrol of cluster-glass states in spinel and garnet ferrite thin films

P88 T. Susaki (Tokyo)

Junction transport mechanism in manganite-titanate heterojunctions

P89 W. Tian (Penn State)

Effect of dimensionality on ferromagnetism in the layered $\text{Sr}_{n+1}\text{Ru}_n\text{O}_{3n+1}$ perovskite oxide series

P90 M. Todd (QinetiQ)

Manganite oxide films on silicon for uncooled thermal imaging

P91 K. Ueno (Tohoku)

Field-effect transistor with charge-ordered $\text{La}_{1/3}\text{Sr}_{2/3}\text{FeO}_3$ Thin Film

P92 A. Venimadhav (Penn State)

Epitaxial thin films and multilayers of high Curie temperature half-metallic ferromagnetic oxides for spintronics

P93 F. Vroegindeweij (Twente)

Oxide thin-film miniature gas sensors