On the origin of metallic conductivity at the interface of LaAlO3/SrTiO3 - DTU Orbit (10/03/2019)

**On the origin of metallic conductivity at the interface of LaAlO3/SrTiO3**

To determine the origin of the quasi-two-dimensional electron gas formed at the interface between the two complex oxides of LaAlO3 (LAO) and SrTiO3 (STO), various amorphous films of LAO, La2O3, Al2O3, and La7/8Sr1/8MnO3 (LSMO), were deposited on TiO2-terminated (0 0 1) STO substrates by pulsed laser deposition at room temperature. Metallic interfaces are observed when the over-layers are amorphous LAO, La2O3, or Al2O3, while insulating interfaces are observed when the over-layer is LSMO. The interfacial conductivity of these SrTiO3-based hetero-structures shows strong dependence on both film thickness and oxygen pressure during film growth. The possible origin for the occurrence of metallic interfaces in these complex oxide hetero-structures due to redox reactions at the STO substrate surface is discussed. A thermodynamic criterion for designing either metallic or insulating interfaces between complex oxides is proposed.

**General information**

State: Published
Organisations: Department of Energy Conversion and Storage, Electrofunctional materials, Secretariat, IT, Functional organic materials, Management
Contributors: Chen, Y., Christensen, D., Trier, F., Pryds, N., Smith, A., Linderoth, S.
Pages: 9242–9245
Publication date: 2012
Peer-reviewed: Yes

**Publication information**

Journal: Applied Surface Science
Volume: 258
Issue number: 23
ISSN (Print): 0169-4332
Ratings:
  - BFI (2019): BFI-level 1
  - Web of Science (2019): Indexed yes
  - BFI (2018): BFI-level 1
  - Web of Science (2018): Indexed yes
  - BFI (2017): BFI-level 1
  - Scopus rating (2017): CiteScore 4.22 SJR 1.093 SNIP 1.328
  - Web of Science (2017): Impact factor 4.439
  - Web of Science (2017): Indexed yes
  - BFI (2016): BFI-level 1
  - Scopus rating (2016): CiteScore 3.37 SJR 0.958 SNIP 1.221
  - Web of Science (2016): Impact factor 3.387
  - Web of Science (2016): Indexed yes
  - BFI (2015): BFI-level 1
  - Scopus rating (2015): CiteScore 3.13 SJR 0.89 SNIP 1.268
  - Web of Science (2015): Impact factor 3.15
  - Web of Science (2015): Indexed yes
  - BFI (2014): BFI-level 1
  - Scopus rating (2014): CiteScore 2.96 SJR 0.948 SNIP 1.453
  - Web of Science (2014): Impact factor 2.711
  - Web of Science (2014): Indexed yes
  - BFI (2013): BFI-level 1
  - Scopus rating (2013): CiteScore 2.78 SJR 0.96 SNIP 1.475
  - Web of Science (2013): Impact factor 2.538
  - ISI indexed (2013): ISI indexed yes
  - Web of Science (2013): Indexed yes
  - BFI (2012): BFI-level 1
  - Scopus rating (2012): CiteScore 2.26 SJR 0.913 SNIP 1.362
  - Web of Science (2012): Impact factor 2.112
  - ISI indexed (2012): ISI indexed yes
  - Web of Science (2012): Indexed yes
  - BFI (2011): BFI-level 1