Curriculum Vitae

Ehab AlShamaileh

Assistant Professor of Physical Chemistry (2004-)
Assistant Dean for Student Affairs (2006- 2007)
Department of Chemistry
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The University of Jordan
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PERSONAL

Born on Wednesday, the 28th July 1971 in the Kingdom of Jordan (Leo).
Married to Valerie Favry and have two boys: Selim (7) and Adnan (5).
Citizenships: Jordanian and French.

ACADEMIC QUALIFICATIONS

PhD in Physical Chemistry/Surface Science (200٢), Dublin City University.
Title: Structural Studies of Metal Adsorption on Cu{100} by Low-Energy Electron-Diffraction.

MSc in Electroanalytical Chemistry (1996), The University of Jordan,
Title: Development and Application of a New HPLC-Electrochemical Detection Method for the Determination of Nitrite and Nitrate.

BSc in Chemistry (1st Honour degree, 1991), Yarmouk University, Jordan.

POSITIONS HELD

Assistant Professor of Physical Chemistry (2004-present)
Assistant Dean for Student Affairs (2006-2007)
Staff Member, teaching and research, Dublin City University (2002-2004)
PhD candidate, teaching and research, Dublin City University (1998-2001)

MEMBERSHIPS OF PROFESSIONAL BODIES

1- Member of the Royal Society of Chemistry UK ………………… MRSC
2- Member of the American Chemical Society USA
3- Member of the International Society of Electrochemistry
4- Member of the Institute of Physics UK ………………………… MIoP
5- Member of the Jordanian Chemical Society Jordan
6- Member of the Jordanian Environment Society Jordan
7- Member of the Institute of Chemistry of Ireland …………….. MICI

AWARDS/SCHOLARSHIPS

1. Elected as a young affiliate to the Academy of Sciences for the Developing World, Trieste, Italy for the years 2007-2011.
2. Spending the first semester of the year 2009-2010 in the University of Reading Laboratories, UK.
3. Award for Postgraduate Excellence within the School of Chemical Sciences (DCU 2002).
4. Postgraduate Scholarship from the Faculty of Graduate Studies at the University of Jordan.

LANGUAGES

English, Arabic et un peu de French!

PUBLICATIONS (For an update, please check ScienceFinder™ or other good re-search engines)

An abstract-detailed list of publications is at the end of this CV.

1	٢٠١٠	**Ehab AlShamaileh**, "**Testing of a new solar coating for solar water heating applications",** Solar Energy, **Accepted** for publication on the 8th June, 2010. http://dx.doi.org/10.1016/j.solener.2010.06.003
2	**2009**	Ubeidulla Al-Qawabeha, Aiman Eid Al-Rawaifeh and **Ehab AlShamaileh**. "**Influence of roller burnishing on surface properties and corrosion resistance in steel",** Anti-Corrosion Methods and Materials (**2009**), 56(5), 261-265.
3	**2009**	**Ehab AlShamaileh, "Adsorption of thiols on polycrystalline gold surface"** Fresenius Environmental Bulletin (**2009**), 18(3), 320-326.
4	**2008**	**E. AlShamaileh,** M. A. Alawi, Y. Dehdal, H. Saada, **Kinetic Stability Study of Selected Hydroxamic Acids Using HPLC/UV.** Jordanian Journal of Pharmaceutical Science (**2008**), 1(1), 57-65.
5	**2008**	Aiman Eid Al-Rawajfeh, Hasan A. Al-Salah, **Ehab AlShamaileh**, Danail Donchev. " **Polyamide-based composite membranes: Part 2. Interaction, crystallization and morphology".** Desalination (**2008**), 227(1-3), 120-131.
6	**2007**	**Ehab Al Shamaileh** and Aiman Al-Rawajfeh. "**Co-adsorption of formic acid and potassium on Cu{100}: a temperature programmed desorption study"** Jordan Journal of Chemistry (**2007**), 2(1), 89-95.
7	**2007**	**Ehab AlShamaileh** and Aiman Al-Rawajfeh. "**Assessment of tap water resources quality and its potential of scale formation and corrosivity in Tafila Province, South Jordan".** Desalination (**2007**), 206(1-3), 322-332.
8	**2007**	Aiman Al-Rawajfeh and **Ehab AlShamaileh**. "**Inhibition of corrosion in steel water pipes by ammonium pyrrolidine dithiocarbamate (APDTC)"** Desalination (**2007**), 206(1-3), 169-178.
9	**2005**	Pussi, K.; AlShamaileh, E.; Cafolla, A. A.; Lindroos, M. **A tensor LEED study of the c(2x2)-Sb adsorption structure on Cu{110}.** Surface Science (2005), 583(2-3), 151-156.
10	**2004**	**AlShamaileh**, Ehab; Pussi, Katariina; Younis, Hamid; Barnes, Colin; Lindroos, Matti. **The structure of oxygen-induced reconstruction on Cu{1 0 0}-c(2 x 2)-Pt surface alloy. The Pt/Cu{1 0 0}-(2 x 2)-O.** Surface Science (2004), 548(1-3), 231-238.
11	**2004**	**AlShamaileh**, Ehab; Pussi, Katariina; McEvoy, Thomas; Lindroos, Matti; Hughes, Greg; Cafolla, Attilio A. **Structural study of the Cu{1 0 0}-p(2 x 2)-Sb surface alloy using low energy electron diffraction.** Surface Science (2004), 566-568(Pt. 1), 52-57.
12	**2004**	**AlShamaileh**, Ehab; Barnes, Colin. **Coverage dependent bonding of potassium on Cu{100}.** Dirasat: Pure Sciences (2004), 31(2), 142-148.
13	**2004**	Pussi, K.; **AlShamaileh**, E.; McLoughlin, E.; Cafolla, A. A.; Lindroos, M. **Determination of the structure of Cu{1 0 0}-p(3√2x2)R45° -Sn by dynamical LEED.** Surface Science (2004), 549(1), 24-30.
14	**2003**	**AlShamaileh**, Ehab; Barnes, Colin J.; Wander, Adrian. **Cu-capped surface alloys of Pt/Cu{100}.** Journal of Physics: Condensed Matter (2003), 15(12), 1879-1887.
15	**2003**	Sainio, J.; **Alshamaileh**, E.; Lahtinen, J.; Barnes, C. J. **Initial growth of Co on Cu{001} studied with LEED I(V).** Surface Review and Letters (2003), 10(4), 641-648.
16	**2003**	Pussi, K.; McEvoy, T.; Barnes, C. J.; Cafolla, A. A.; AlShamaileh, E.; Lindroos, M. **Determination of the structure of Cu{1 0 0}-c(4x4)-In by TLEED.** Surface Science (2003), 526(1-2), 141-148.
17	**2003**	Cafolla, A. A.; McLoughlin, E.; **AlShamaileh**, E.; Guaino, Ph.; Sheerin, G.; Carty, D.; McEvoy, T.; Barnes, C.; Dhanak, V.; Santoni, A. **Observation of an anti-phase domain structure in the Cu{100}/Sn surface alloy system.** Surface Science (2003), 544(1), 121-133.

18	**2002**	Pussi, K.; Lindroos, M.; **AlShamaileh**, E.; Barnes, C. J. **A SATLEED study of the geometric structure of Cu{1 0 0}-Pd monolayer surface alloys.** Surface Science (2002), 513(3), 555-568.
19	**2002**	**AlShamaileh**, E.; Younis, H.; Barnes, C. J.; Pussi, K.; Lindroos, M. **A tensor LEED determination of the structure and compositional profile of a Cu{1 0 0}-c(2x 2)-Pt surface alloy.** Surface Science (2002), 515(1), 94-102.
20	**2002**	**AlShamaileh**, Ehab; Barnes, Colin. **LEED investigation of the alloying/de-alloying transition in the Cu{100}/Bi system.** Physical Chemistry Chemical Physics (2002), 4(20), 5148-5153.
21	**2001**	McLoughlin, E.; Cafolla, A. A.; **AlShamaileh**, E.; Barnes, C. J. **A re-interpretation of the Cu{1 0 0}/Sn surface phase diagram.** Surface Science (2001), 482-485(Pt. 2), 1431-1439.
22	**2001**	Barnes, C. J.; **AlShamaileh**, E.; Pitkanen, T.; Lindroos, M. **Early stages of surface alloy formation: a diffuse LEED I(V) study.** Surface Science (2001), 482-485(Pt. 2), 1425-1430.
23	**2001**	Barnes, C. J.; **AlShamaileh**, E.; Pitkanen, T.; Kaukasoina, P.; Lindroos, M. **The kinetics of formation and structure of an underlayer alloy. The Cu(1 0 0)-c(2x2)-Pd system.** Surface Science (2001), 492(1-2), 55-66.
24	**1995**	M. Hourani, E. **Shamaileh**, K. Ibrahim, **Electroanalysis of Ag+, Hg2+ and Fe3+ by voltammetry at an iodine-coated platinum electrode,** Arab. Gulf. J. Sci. Res. 1995, 13, 225.

ORAL PRESENTATIONS

1. “Capping gold nanoparticles with dithiocarbamate”, E. AlShamaileh. Conference on Nanotechnology, Al-Hasan Scientific City, Amman, Jordan, May 2009.
2. Structural and Chemical Properties of Surface Alloys, E. AlShamaileh, Al-Hussein University, Maan, March 2009.
3. “ Probing Surface Kinetics and Reaction Pathways via Temperature Programmed Desorption Spectroscopies” E. AlShamaileh and C.J. Barnes The 54th Irish Universities Chemistry Research Colloquium, Queen’s University, Belfast, UK, 10th –12th April 2002.
4. “Structural analysis of Cu(100)-Palladium monolayer surface alloys” K. Pussi, M. Lindroos, E. AlShamaileh and C.J. Barnes VIIth European Conf. on Surface Crystallography and Dynamics (ECSCD-7), Leiden, The Netherlands, 26-29 Aug. 2001.
5. “Surface Alloys: Structural and Chemical Properties” E. AlShamaileh and C.J. Barnes The 53rd Irish Universities Chemistry Research Colloquium, University College Dublin, Ireland, 20th – 22nd June 2001.
6. “Structural Properties and Chemical Reactivity of the Cu(100)/Pd Surface Alloy System” E. AlShamaileh and C.J. Barnes 1st DD Eley Conference on Surface Science and Catalysis, University of Nottingham, UK, 27th – 30th June 2000.

POSTER PRESENTATIONS

1. “ Measurement of the sticking probability of alkanethiol adsorption on gold surfaces by cyclic voltammetry” E. AlShamaileh, The 57th Annual Meeting of the International Society of Electrochemistry, Edinburgh, UK, 27th Aug.-1st Sept. 2006.
2. “ Corrosion Inhibition of Steel and Copper Water Pipes by APDTC, E. AlShamaileh and A. Rawajfeh, The 57th Annual Meeting of the International Society of Electrochemistry, Edinburgh, UK, 27th Aug.-1st Sept. 2006.
3. “A re-interpretation of the Cu {1 0 0}/Sn surface phase diagram” E. McLoughlin, A. A. Cafolla, E. AlShamaileh and C. J. Barnes ECOSS-19 Nineteenth European Conference on Surface Science, Madrid, Spain, 5th –8th September 2000.
4. “Early stages of surface alloy formation: a diffuse LEED I(V) study”, C. J. Barnes, E. AlShamaileh, T. Pitk?nen and M. Lindroos ECOSS-19 Nineteenth European Conference on Surface Science, Madrid, Spain, 5th –8th September 2000.
5. “Development and Application of a New HPLC-Electrochemical Detection Method for the Determination of Nitrite and Nitrate” E. AlShamaileh, M. Hourani and M. Alawi ELECTROCHEM 2000, Dublin City University, Ireland, 13th-15th September 2000.
6. “THE THERMAL DESORPTION OF NO, N2 O AND CO ON Pt(331)” EN Timothy, E AlShamaileh, CJ Barnes, ME Bridge The 52nd Irish Universities Research Colloquium, University College, Cork,10th -12th May 2000.

7. “Coverage Dependent Structure and Reactivity of Cu{100}-c(2x2)-Pt Surface Alloys” K. Pussi, M. Lindroos, E. AlShamaileh and C. J. Barnes ECOSS-20 Twentieth European Conference on Surface Science, Krakow, Poland, 4th –7th September 2001.
8. “A Tensor LEED Structural Determination of a Cu {100}-c(2x2)-Pt Multilayer Surface Alloy” E. AlShamaileh, C. J. Barnes, K. Pussi and M. Lindroos ECOSS-20 Twentieth European Conference on Surface Science, Krakow, Poland, 4th –7th September 2001.
9. “The Structure and Reactivity of Oxygen Overlayers on Cu {100}-c (2x2)-Pt Surface Alloy” K. Pussi, M. Lindroos, E. AlShamaileh and C. J. Barnes ECOSS-21 Twenty first European Conference on Surface Science, Malmo, Sweden, 24th –28th June 2002.

SELECTD CONFERENCES ATTENDED

1. “ Measurement of the sticking probability of alkanethiol adsorption on gold surfaces by cyclic voltammetry” E. AlShamaileh, The 57th Annual Meeting of the International Society of Electrochemistry, Edinburgh, UK, 27th Aug.-1st Sept. 2006.
2. Conference on Materials RAKCAM, UAE, 2008
3. “Teaching First Year Physics at Third Level”, 2nd May 2002, School of Physics, Dublin Institute of Technology, Dublin,
4. “RSC Symposium on Photochemistry”, 24th May 2002, School of Chemistry, Dublin Institute of Technology,
5. “29th Annual Conference of the Plasma Physics Group of the Institute of Physics” 25th – 28th March 2002, the Ramada Belfast Conference Centre, Belfast, UK.

SELECTED WORKSHOPS ATTENDED

1. TWAS-BioVision Alexandria, Bibalex, Alexandria, Egypt, 2010.
2. SESAME, Egypt Annual Workshop, 2009.
3. A 2-week research activity to ELLETRA (Italian Synchrotron in Trieste), 2009.
4. SESAME, Jordan Annual Workshop, 2008.
5. A 3-week trip to BESSY (The "Berliner Elektronenspeicherring-Gesellschaft für Synchrotron Strahlung (Berlin electron storage ring company for synchrotron radiation)) NEXAFS and LEED experiments adsorbing NO, N2O and CO on Pt{331}. Berlin, Germany, July 2001.
6. One week workshop on Theory, Simulation and Methods in Surface Science, Daresbury Laboratory, UK, Nov. 2001.

OTHER PUBLICATIONS AND COURSE DEVELOPMENT

1. Updating the Physical Chemistry Practical Manual, The University of Jordan, 2008-2010.
2. General Chemistry (in Arabic), Al-Rowad Publications.
3. Updating the Physical Chemistry Manual for second-year laboratories taught in the School of Chemical Sciences at Dublin City University, 2000.
4. Preparing a manual for third-year instrumental analysis practical course in chromatography and electrochemistry, the University of Jordan, 1994.
5. Writing an experimental chemistry manual and teaching it for three years within the CTYI program for young school students, 1999-2002.

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List of publications as of June 2010

1) Ehab AlShamaileh, “Testing of a new solar coating for solar water heating applications”, *Solar Energy,* Accepted for publication on the 8th June, **2010**.

Abstract

A novel and affordable solar selective coating exhibiting higher solar absorption efficiency compared to the commercial black paint coating used in most ordinary solar water heating systems (SWHSs) has been developed. The coating is fabricated by embedding a metallic particle composed of a nickel-aluminium (NiAl) alloy into the black paint. The optical behaviour of several percentages of the NiAl alloy in the coating is studied using UV-vis and IR spectroscopies. The chemical composition of the coating was characterized using XRD and thermo-gravimetric analysis (TGA) for both the black and alloy-containing paint. The results allowed deducing that the optimum composition to consider for further testing was 6% NiAl alloy by mass. The applicability of the coating in a real thermosyphonic SWHS was evaluated throughout the year, spanning both hot and cold seasons. It is found that the new coating shows better performance compared to the untreated black paint by an average of 5 ^{o}C over a period of one year. The corrosion resistance of the coating was investigated using electrochemical polarization and weight- loss measurements in the corrosive medium of 3% NaCl in 0.50 M HCl. Higher inhibition efficiency of corrosion was found for the alloy-containing paint compared to the

untreated paint by more than 12%. Finally, Scanning Electron Microscopy (SEM) was used to explore the morphology of the modified coating surface, and compared to the untreated surface.

2) Ubeidulla Al-Qawabeha, Aiman Eid Al-Rawaifeh and **Ehab AlShamaileh**. “**Influence of roller burnishing on surface properties and corrosion resistance in steel”,** Anti-Corrosion Methods and Materials (**2009**), 56(5), 261-265.

Abstract
Purpose - Roller burnishing (RB) is a finishing treatment method that is used to impart certain phys. and mech. properties, such as surface roughness, improved visual appearance, or increased corrosion, friction, wear, and fatigue resistance. The purpose of this paper is to study, the influence of RB on corrosion resistance in A53 steel in HCl soln. Design/methodology./approach – Micro-hardness (MH), microstructure, wt. loss, and potentiostatic polarization are investigated at pressing forces of 40, 60, 80, 100 and 120 N. Findings - MH increases with increasing the applied force and the percentage improvements are found to be 12, 24, 28, 35 and 65 percent for 40, 60, 80, 100 and 120 N RB pressing forces, resp. Wt. losses, in general, showed an optimum value at about 80 N. Corrosion potential and corrosion current decrease with increasing pressing force and reached a min. at about 80 N, then begin to increase with increasing RB force. Originality/value - The results present in this paper are important to the understanding of the effect of the surface plastic deformation methods on surface properties and corrosion resistance in steel.

3) Ehab AlShamaileh, “Adsorption of thiols on polycrystalline gold surface” Fresenius Environmental Bulletin (**2009**), 18(3), 320-326.

Abstract
Adsorption of thiols on metallic surfaces is one of the methods used for their removal from the environment. Alkanethiols and their degrdation products have been detected in the environment and classified as highly toxic with distinctive odor at very low concentrations. 1-Octadecanethiol is a representing example of this family and its adsorption on polycrystalline gold surface serves as a model for the study of its adsorption on metals prior to their removal from polluted water. The adsorption extent was evaluated by measuring the sticking probability of self-assembled 1-octadecanethiol on the surface of polycrystalline Au using the electrochemical method of cyclic voltammetry. A Langmuir-like adsorption kinetics was obsd. for the 1-octadecanethiol adsorption on Au at high micromolar concentrations which became more precursor-like at 7.0-10.0 □ 10-4 mM concentrations. At 5.0 □ 10-4 mM concentration, the adsorption isotherm revealed an addnl. feature which could be explained by the initial adsorption of the solvent and subsequent removal by the strong Au-S bond formation. The formation of such bonding could be also explained by the formation of a "lying down" phase of the 1-octadecanethiol on Au surface. The results compare well with data obtained employing other methods reported in the literature.

4) E. AlShamaileh, M. A. Alawi, Y. Dehdal, H. Saada, “**Kinetic Stability Study of Selected Hydroxamic Acids Using HPLC/UV**”, Jordanian Journal of Pharmaceutical Science (**2008**), 1(1), 55-64.

Abstract
The kinetics of the acid and base hydrolysis of salicylhydroxamic acid (SHAM) and O-acetyl-salicylhydroxamic acid (OAc-SHAM) were studied using High Performance Liquid Chromatography with UV-Detection (HPLC-UV). The effect of temperature and pH values on the hydrolysis was investigated. It was found that both SHAM and OAc-SHAM were more stable in basic media (high pH values) and at lower temperatures; whereas all reactions were found to follow pseudo-first order kinetics. Reaction rate constants (k) were calculated at different temperatures and pH values. The general trend was that as pH values of the solution increase (basic media), the rate constant decreases indicating a slow hydrolysis rate for both acids. Also, low hydrolysis rates were observed with decreasing the temperature in all cases. The oxidation was also investigated with a solution of 1.0 % hydrogen peroxide (H2O2) as the oxidizing agent. OAc-SHAM was found to be insoluble in the H2O2 solution. While SHAM was almost hydrolyzed in two hours at room temperature.

5) Aiman Eid Al-Rawajfeh, Hasan A. Al-Salah, **Ehab AlShamaileh**, Danail Donchev. “ **Polyamide-based composite membranes: Part 2. Interaction, crystallization and morphology”.** Desalination (**2008**), 227(1-3), 120-131.

Abstract

The interaction, crystallization and morphology. of membranes derived from polyamides/poly (vinylalcohol) (PA/PVA, PA: PA66, PA69, PA610 and PA612) blend materials are studied at various wt. fractions and various crystallization temperatures The exptl. work includes differential scanning calorimetry (DSC), FTIR spectroscopy, polarized optical microscopy (POM) and SEM. The equilibrium melting temperatures of polyamides in the blends are obtained using Hoffman-Weeks plots, and the interaction parameters are calculated. using the Nishi-Wang equation, which is based on the Flory-Huggins theory. The values of the Flory-Huggins interaction parameters □12 are neg. Significant upward shifts of □NH are observed with increasing vol. fraction of PVA. The morphology. of membranes is impressively complex, diverse, and irregular. All compounds that show nodular morphology. are in the □m-scale and the size of the nodules increases with increasing PA6 content. Large void cavities are observed in the substructure for the lower polymer concentrations.

6) **Ehab Al Shamaileh** and Aiman Al-Rawajfeh. "**Co-adsorption of formic acid and potassium on Cu{100}: a temperature programmed desorption study"** Jordan Journal of Chemistry (**2007**), 2(1), 89-95.

Abstract

The adsorption and decompn. of formic acid (HCOOH) co-adsorbed with K on Cu{100} was studied by the spectroscopic technique of temp. programmed desorption (TPD). For the adsorption of K on Cu{100}, the activation energy for desorption falls drastically with increasing coverage from 214 kJ.mol-1 at the low coverage of 0.01 ML (ML = monolayer) to 139 kJ.mole-1 at close to completion of the first potassium layer (0.35 ML). The pre-adsorption of Cu{100} by a satn. coverage (>10 ML) of HCOOH instigates a different adsorption-desorption behavior compared to the K/Cu{100}. Below and at the low K coverage of 0.009 ML on HCOOH pre-adsorbed on Cu{100}, a destabilization of the predominantly strong polar covalent Cu-K bonding occurs indicated by the significant decrease in the desorption peak temp. (Tp) from 800 to 560 K. At a coverage of 0.02 ML, the peak temp. is found to split to lower values pertaining the original high Tp. This behavior can be explained by the formation of K-HCOOH compds. that desorb at different Tp values. At higher K coverages on pure Cu{100}, a weaker Cu-K bonding takes place and a metallic-like potassium behavior emerges which is attributed to the presence of lateral K-K interactions. At higher K coverages (>0.025 ML) on the Cu{100} pre-adsorbed with HCOOH, a very complex TPD spectrum is obtained. A complex range of K-HCOOH reaction products might be the only way to explain such a spectrum.

7) **Ehab AlShamaileh** and Aiman Al-Rawajfeh. "**Assessment of tap water resources quality and its potential of scale formation and corrosivity in Tafila Province, South Jordan".** Desalination (**2007**), 206(1-3), 322-332.

Abstract

This paper discusses the concept of water quality and stability, describes various indexes available to assess the scale formation (protective layer) and corrosivity of water and the methods of their calcn. for different tap water resources in Tafila City, south Jordan. The satn. levels are calcd. by Langelier satn. index (LSI), Ryznar stability index (RSI) and the calcium carbonate pptn. potential (CCPP). LSI values are neg. and range from -0.39 to -1.5 while RSI values range from 8.7 to 9.8. CCPP values are neg. and range from -1.77 to -16.76. Although these results indicate corrosion conditions, this image changes upon heating and evapn. of water with the release of CO2. Water samples exhibit high concns. of Cl-, SO42- and HCO3- as the major anions and Ca2+ and Mg2+ as the major cations. Magnesium has a threshold limit of max. CaCO3 soly. at about 0.00424 M. Microbiol. tests indicate that three of the water samples (the three springs) are polluted with total and fecal coliform bacteria. Moreover, high concn. of nitrate has been detected in one of the springs. Most of the water samples have SO42-/HCO3- ratio of less than 1. At least 94% of the scale compn. is CaCO3 (aragonite).

8) Aiman Al-Rawajfeh and **Ehab AlShamaileh**. "**Inhibition of corrosion in steel water pipes by ammonium pyrrolidine dithiocarbamate (APDTC)"** Desalination (**2007**), 206(1-3), 169-178.

Abstract

Corrosion inhibition in steel water pipes, used in Jordan National Water Supply Network (JNWSN), is studied in different corrosive media by adsorption of ammonium pyrrolidine dithiocarbamate (APDTC) on the surface of the pipes. APDTC is a nontoxic material widely used in agricultural applications. The exptl. work utilized mainly wt. loss expts. and UV-visible spectrophotometric anal. The effect of the corrosive soln. concn., APDTC concn. and immersion period on the corrosion inhibition efficiency of APDTC are studied and interpreted. Wt. loss exptl. results indicate that inhibitor efficiency increases with increasing the inhibitor concn. and the immersion period. The inhibitor efficiency decreases with increasing the concn. of the corrosive solns. The inhibitor efficiency is checked detg. the concns. of Fe2+ and APDTC in the solns.

9) K. Pussi, **E. AlShamaileh**, A. A. Cafolla and M. Lindroos. "**A tensor LEED study of the c(2□ 2)-Sb adsorption structure on Cu{110}".** Surface Science (**2005**), 583(2-3), 151-156.

Abstract

0.5 ML of Sb was adsorbed on Cu{1 1 0} at room temp. (300 K). This leads to formation of a c(2 □ 2) phase, which was studied by quant. LEED. The favored structure is a substitutional surface alloy where every other top layer Cu atom was replaced by an Sb atom. The Sb atoms are buckled toward the solid vacuum interface by 0.25 □ 0.05 .ANG. with respect to the first layer Cu atoms. Buckling of the deeper at. layers is negligible. The Pendry R-factor for the favored structure is 0.20.

10) Ehab AlShamaileh, Katariina Pussi, Hamid Younis, Colin Barnes, Matti Lindroos. "**The structure of oxygen-induced reconstruction on Cu{1 0 0}-c(2 □ 2)-Pt surface alloy. The Pt/Cu{1 0 0}-(2 □ 2)-O".** Surface Science (**2004**), 548(1-3), 231-238.

Abstract

Adsorption of 0.25 ML O on the Cu{1 0 0}-c(2 □ 2)-Pt surface alloy followed by a brief thermal activation to 500 K and recooling to room temp. leads to the formation of a surface structure with a p(2 □ 2) periodicity. The structure of this Pt/Cu{1 0 0}-(2 □ 2)-O was detd. by quant. LEED calcns. using the symmetrized automated tensor LEED (SATLEED) program. Simple p(2 □ 2) overlayers can be ruled out in favor of an O-induced surface reconstruction. The favored model (Pendry R-factor=0.23) consists of a mixed c(2 □ 2) CuPt underlayer below a reconstructed Cu{1 0 0} outermost layer with O atoms occupying a slightly displaced fourfold hollow sites above second layer Pt atoms relative to the original unreconstructed surface.

11) Ehab AlShamaileh, Katariina Pussi, Thomas McEvoy, Matti Lindroos, Greg Hughes and Attilio A Cafolla. "**Structural study of the Cu{1 0 0}-p(2 □ 2)-Sb surface alloy using low energy electron diffraction".** Surface Science (**2004**), 566-568(Pt. 1), 52-57.

Abstract

The deposition of 0.25 ML Sb on clean Cu{1 0 0} at room temp. results in a p(2 □ 2) LEED pattern. The structure of the Cu{1 0 0}-p(2 □ 2)-Sb phase was detd. using tensor LEED. Despite the large size mismatch between Sb (at. radius = 1.450 .ANG.) and Cu (at. radius = 1.278 .ANG.), a surface alloy is formed in which Sb atoms substitute Cu atom in the outermost layer. Sb is found to ripple outward from the surface by 0.56 □ 0.05 .ANG.. The 2nd and deeper Cu layers are close to their bulk values.

12) Ehab AlShamaileh and Colin Barnes. "**Coverage dependent bonding of potassium on Cu{100}".** Dirasat: Pure Sciences (**2004**), 31(2), 142-148.

Abstract

The coverage dependent bonding of K on the Cu single crystal Cu {100} was studied by Temp. Programmed Desorption (TPD) spectroscopy anal. The activation energy for desorption falls drastically with increasing coverage from 214 kl.mole-1 at low coverage (□K = 0.01 ML) to 139 kJ.mole-1 at close to completion of the first K layer (□K = 0.35 ML). An abrupt decrease in the activation energy for desorption occurs in the coverage range □K = 0.10 to □K = 0.20 ML combined with a discontinuity in the integrated mass 39 desorption yield suggestive of a phase transition from a dispersed 2D gas to a condensed liq. phase. Second layer adsorption is stable for room temp. adsorption, with a desorption activation energy of 45 kJ mole-1. The K undergoes a transformation from predominantly strong polar covalent Cu-K bonding at low K coverage to weaker Cu-K bonding and metallic- like K behavior at coverages higher than □K = 0.15 ML where lateral K-K interactions play an increasingly important role.

13) Katariina Pussi, **Ehab AlShamaileh**, E.; McLoughlin, Attilio A Cafolla and Matti Lindroos. "**Determination of the structure of Cu{1 0 0}-p(3□ 2□□ 2)R45□ -Sn by dynamical LEED".** Surface Science (**2004**), 549(1), 24-30.

Abstract

The geometrical structure of 0.50 ML Sn adsorbed on Cu{1 0 0} surface has been studied using Symmetrized Automated Tensor LEED. At this coverage, a p(3□2□□2)R45□ ordered surface structure is formed. The favored structure is a substitutional surface alloy, that includes a missing row reconstruction. This structure might have originated a from c(2 □ 2) superstructure. The p(3□2□□2)R45□ phase is formed by bringing pairs of Sn atoms together in the Cu{1 0 0}-c(2 □ 2)-Sn alloyed top layer and removing every third row of copper in the top layer. The two in-equiv. tin atoms in the first layer are buckled towards the solid-vacuum interface by 0.39/0.27 □ 0.07 A with respect to the first layer copper atoms. The buckling between the Sn atoms is 0.12 □ 0.08 A. The lateral displacement of Sn atoms is of magnitude 0.26 □ 0.10 A. The first interlayer spacing is expanded by 4% with respect to the bulk value. Pendry reliability factor has been used to measure the level of agreement between theory and expt. giving a moderate value of 0.26 for the favored structure.

14) AlShamaileh, Ehab; Barnes, Colin J.; Wander, Adrian. **Cu-capped surface alloys of Pt/Cu{100}.** Journal of Physics: Condensed Matter (2003), 15(12), 1879-1887.

Abstract

The room-temp. deposition of 0.5 monolayer (ML) Pt on Cu{100} followed by annealing to 525 K results in a sharp c(2 □ 2) LEED pattern. The structure of this surface alloy is investigated by means of symmetrized automated tensor LEED (SATLEED) anal. and ab initio plane wave d. functional calcns. The results are then compared with those for the similar system 0.5 ML Pd/Cu{100}. SATLEED results for the Pt/Cu{100} show that it consists of an ordered c(2 □ 2) Cu-Pt second layer alloy capped with a pure Cu first layer. The first and second interlayer spacings are found to be expanded by +5.1 □ 1.7 and +3.5 □ 1.7% resp. (relative to the bulk Cu interlayer spacing of 1.807 .ANG.) due to the insertion of the 8% larger Pt atoms into the second layer. The ordered mixed layer is found to be rippled by 0.08 □ 0.06 .ANG. with Pt atoms rippled outwards towards the solid-vacuum interface. A smaller rippling of 0.03 □ 0.11 .ANG. in the fourth pure Cu layer was also detected with Cu atoms directly underneath Pt atoms rippled towards the second layer Pt resulting in a Pt-Cu bond length of 2.52 .ANG. which compares with the sum of metallic radii of 2.67 .ANG.. A recent quant. SATLEED anal. for 0.5 ML Pd/Cu{100} was performed in an earlier study (Barnes et al 2001 Surf. Sci. 492 55). A similar structure to the Pt/Cu{100} has been retrieved with slight differences in the interlayer spacings. The ab initio d. functional results are fully consistent with the exptl. detd. structures. However, they reveal an interesting difference between the stability of the Pd and Pt systems and highlight the fact that the Pd/Cu structure is best thought of as a metastable structure occurring as an intermediate step in the diffusion of the transitional metal ion into the bulk of the Cu substrate.

15) Sainio, J.; **Alshamaileh, E.;** Lahtinen, J.; Barnes, C. J. "**Initial growth of Co on Cu{001} studied with LEED I(V)".** Surface Review and Letters (**2003**), 10(4), 641-648.

Abstract

The initial growth of Co deposited at room temp. on Cu{001} was studied with LEED and temp.-programmed desorption (TPD). Measured I(V) spectra were compared with calcd. spectra from several model structures, including substitutionally disordered alloys. The averaged T-matrix approxn. (ATA) was used to model the random alloy layers. According to the I(V) anal., alloying occurs in the first stages of the growth. TPD of Co indicates that both large areas of Co and areas of a surface alloy are already present at the lowest coverage. Both methods show that a transition to layer-by-layer growth occurs as the coverage increases.

16) Pussi, K.; McEvoy, T.; Barnes, C. J.; Cafolla, A. A.; AlShamaileh, E.; Lindroos, M. **Determination of the structure of Cu{1 0 0}-c(4x4)-In by TLEED.** Surface Science (2003), 526(1-2), 141-148.

Abstract

Tensor LEED (TLEED) was used to study the structure of In adsorbed on Cu{100} surface at a coverage of 0.60 ML. At this coverage, a c(4 □ 4) ordered surface structure is formed. The favored structure is an overlayer in which the two top layers are pure indium. The indium layer closest to bulk has a c(2 □ 2) periodicity, in which In atoms lie at fourfold hollow sites with respect to the substrate. This c(2 □ 2)-In layer is overlayered by a c(4 □ 4) layer in which indium atoms lie at fourfold hollow sites with respect to the c(2 □ 2)-In layer. Indium atoms in the c(2 □ 2)-In layer are laterally shifted off the hollow sites towards bridge sites by 0.28 .ANG.. Pendry reliability factor was used to measure the level of agreement between theory and expt. giving a value of 0.28 for the favored structure.

17) Cafolla, A. A.; McLoughlin, E.; **Al-Shamaileh, E.;** Guaino, Ph.; Sheerin, G.; Carty, D.; McEvoy, T.; Barnes, C.; Dhanak, V.; Santoni, A. “**Observation of an anti-phase domain structure in the Cu{100}/Sn surface alloy system”.** Surface Science (**2003**), 544(1), 121-133.

Abstract

LEED, scanning tunneling microscopy (STM), and the normal incidence x-ray standing wave (NIXSW) technique were used to det. the structure of the first surface phase formed on Cu{100} upon deposition of 0.21 monolayers (ML) of tin. At this coverage the LEED images exhibits a modified p(2x2) structure with split fractional order diffraction spots. A double scattering LEED pattern simulation consistent with both the Sn surface coverage and the complex split beam LEED pattern suggests an ordered phase based on a p(2 □ 2) structure with light anti-phase domain walls. Possible adsorption sites are identified from NIXSW data by triangulation of the distances between the Sn atoms and the (200) and (111) planes. Sn atoms adsorb in a fourfold site but does not distinguish between overlayer and substitutional sites. The STM data reveal small domains of p(2x2) structure formed by the Sn atoms being adsorbed in substitutional sites. These domains typically contain 16 Sn atoms arranged in a square 4x4 array, however larger and smaller rectangular domains are also obsd. with sides contg. three, five and six Sn atoms. The width of the domain wall is found to vary with rows of one, three or five copper atoms sepg. the domains in both the [011] and [011] directions. The STM images indicate that the Cu atoms in the domain walls are vertically displaced from their expected positions. This is attributed to elastic strain due to the large metallic diam. of Sn (0.162 nm) relative to Cu (0.127 nm).

18) A SATLEED study of the geometric structure of Cu{1 0 0}-Pd monolayer surface alloys. Pussi, K.; Lindroos, M.; AlShamaileh, E.; Barnes, C. J. Institute of Physics, Tampere University of Technology, Tampere, Finland. Surface Science (2002), 513(3), 555-568. Publisher: Elsevier Science B.V., CODEN: SUSCAS ISSN: 0039-6028. Journal written in English. CAN 137:159706 AN 2002:533433 CAPLUS (Copyright (C) 2008 ACS on SciFinder (R))

Abstract

The structure of a Cu{1 0 0}-p(2□2) surface alloy formed by deposition of 1 ML of Pd on Cu{1 0 0} at room temp. was studied by symmetrized automated tensor LEED. The favored model from the wide range tested consists of a double layer ordered c(2□2) CuPd alloy with p(2□2)-p2gg symmetry introduced into the outermost layer via clock rotation of the CuPd monolayer with the corners of the p(2□2) unit cell centered over second layer Pd atoms (Rp = 0.21). Lateral shifts of the top layer Cu and Pd atoms are detd. to be 0.25□0.12 .ANG.. Substitution of 0.5 ML of Pd in both layers 1 and 2 leads to a significant expansion of the outermost two interlayer spacing to 1.93 □ 0.02 .ANG. (+6.6 □ 1.1%) and 1.90 □ 0.03 .ANG. (+5.3 □ 1.7%) and a rippling of Pd and Cu atoms in the outermost layer of 0.06 □ 0.03 .ANG. with top layer Pd atoms rippled outwards. This model is in agreement with previous ion scattering studies of a Cu:Pd stoichiometry of 1:1 in the outermost 2 layers. A second mode of film growth consisting of adsorption of 0.5 ML of Pd on a copper capped Cu{1 0 0}-c(2□2)-Pd underlayer alloy leads to a structure which retains a simpler c(2□2) periodicity, suggesting that the growth of the p(2□2)-glide line phase requires a c(2□2) CuPd outermost template.

19) A tensor LEED determination of the structure and compositional profile of a Cu{1 0 0}-c(2□2)-Pt surface alloy. AlShamaileh, E.; Younis, H.; Barnes, C. J.; Pussi, K.; Lindroos, M. School of Physical Sciences, Plasma Research Laboratory, Dublin City University, Dublin, Ire. Surface Science (2002), 515(1), 94-102. Publisher: Elsevier Science B.V., CODEN: SUSCAS ISSN: 0039-6028. Journal written in English. CAN 137:191124 AN 2002:580805 CAPLUS (Copyright (C) 2008 ACS on SciFinder (R))

Abstract

The geometric structure and compositional profile of a Cu{1 0 0}-c(2□2)-Pt surface alloy formed by thermal activation of a monolayer Pt film was detd. by tensor LEED. A wide range of models were tested. The favored model consists of an ordered c(2□2) CuPt underlayer below a Cu terminated surface. Models involving a mixed ordered CuPt layer outermost may be definitively ruled out. The av. T-matrix approxn. (ATA) was applied allowing variable Pt concns. to be introduced into both the outermost layer and deeper into the selvedge (layers 3 and 4) in the form of a random substitutionally disordered CuxPt1-x alloy. The favored concn. profile corresponds to an almost pure outermost Cu monolayer (□Pt = 10 □ 10 at.%) with Pt concns. of 20 □ 20 and 30 □ 30 at.% in layers 3 and 4 resp. Introduction of Pt into the surface layers induces a significant expansion of the selvedge yielding modification of the outermost 3 interlayer spacings to 1.84 □ 0.02 .ANG. (□dz12 = +1.9 □ 1.1%), 1.91 □ 0.03 .ANG. (□dz23 = +5.8 □ 1.7%) and 1.89 □ 0.03 .ANG. (□dz34 = +4.7 □ 1.7%). The rippling in the first mixed CuPt monolayer is small and of amplitude 0.03 □ 0.04 .ANG. with Pt rippled outwards towards the solid-vacuum interface.

20) LEED investigation of the alloying/de-alloying transition in the Cu{100}/Bi system. AlShamaileh, Ehab; Barnes, Colin. Plasma Research Laboratory, School of Physical Sciences, Dublin City University, Dublin 9, Ire. Physical Chemistry Chemical Physics (2002), 4(20), 5148-5153. Publisher: Royal Society of Chemistry, CODEN: PPCPFQ ISSN: 1463-9076. Journal written in English. CAN 138:27667 AN 2002:753974 CAPLUS (Copyright (C) 2008 ACS on SciFinder (R))

Abstract

The surface structures formed by deposition of 0.25 ML and 0.50 ML Bi on Cu{100} at room temp. were detd. quant. using the symmetrised automated tensor LEED (SATLEED). At □Bi = 0.25 ML, Bi forms a semi-ordered p(2 □ 2) surface alloy with the Bi atoms located at a height of 0.56 □ 0.06 .ANG. with respect to center of gravity of the buckled outermost Cu layer (buckling amplitude = 0.11 .ANG.). The interlayer spacings in the first three substrate layers are : d12 = 1.71 □ 0.06 .ANG., d23 = 1.82 □ 0.06 .ANG., d34 = 1.81 □ 0.06 .ANG. (dbulk = 1.807 .ANG.). The first and the third Cu layers are buckled by 0.11 □ 0.06 .ANG. and 0.05 □ 0.06 .ANG., resp. At higher Bi coverage, de-alloying occurs culminating in formation of a well ordered c(2 □ 2) overlayer at □Bi = 0.50 ML. Bi atoms occupy the four-fold hollow sites with a vertical Bi-Cu interlayer sepn. of dBi-Cu = 2.17 □ 0.06 .ANG. above a slightly perturbed substrate. The interlayer spacing in the first four substrate layers are : d12 = 1.82 □ 0.03 .ANG., d23 = 1.80 □ 0.03 .ANG. and d34 = 1.84 □ 0.03 .ANG.. A small buckling of 0.02 □ 0.02 .ANG. is detected in the second Cu layer in which Cu atoms below Bi atoms are rippled outwards. The structures obtained by LEED are compared to those evaluated recently for the same system by surface x-ray diffraction.

21) A re-interpretation of the Cu{1 0 0}/Sn surface phase diagram. McLoughlin, E.; Cafolla, A. A.; AlShamaileh, E.; Barnes, C. J. School of Physical Sciences, Department of Applied Physics, Dublin City University, Dublin, Ire. Surface Science (2001), 482-485(Pt. 2), 1431-1439. Publisher: Elsevier Science B.V., CODEN: SUSCAS ISSN: 0039-6028. Journal written in English. CAN 135:158144 AN 2001:502159 CAPLUS (Copyright (C) 2008 ACS on SciFinder (R))

Abstract

The coverage dependent structural phase transitions of Sn on Cu{1 0 0} were re-examd. by LEED. Double scattering LEED pattern simulations were applied both to a range of possible new models and to previously suggested structures with the aim of identifying the most likely surface geometries throughout the sub-monolayer coverage regime. A model consistent with both the Sn surface coverage and the complex split beam LEED pattern obsd. was suggested for the low coverage (□Sn = 0.21 ML) ordered phase based on a p(2□2) structure with "light" antiphase domain walls. Higher coverage p(2□6) (□Sn = 0.37 ML) and p(3□2□□2)R45□ (□Sn = 0.50 ML) structures based on c(2□2) local periodicity yield a consistent explanation of the LEED data. While the simulations identify likely structures, the limitations of this approach mitigate against definitive structural assignments. However simulations for models based on c(2□2) structures incorporating defects in the form of periodic d. modulations combined with substrate reconstruction lead to an enhanced agreement with obsd. LEED data compared to overlayer models previously suggested.

22) Early stages of surface alloy formation: a diffuse LEED I(V) study. Barnes, C. J.; AlShamaileh, E.; Pitkanen, T.; Lindroos, M. School of Chemical Sciences, Dublin City University, Dublin, Ire. Surface Science (2001), 482-485(Pt. 2), 1425-1430. Publisher: Elsevier Science B.V., CODEN: SUSCAS ISSN: 0039-6028. Journal written in English. CAN 135:169354 AN 2001:502158 CAPLUS (Copyright (C) 2008 ACS on SciFinder (R))

Abstract

The technique of diffuse LEED I(V) anal. is a useful quant. probe of the structure of surface alloys in the early stages of growth before long-range order develops. The Cu(1 0 0)/Pd system was studied in the Pd coverage range 0.10-0.55 monolayer (ML). It was demonstrated that Pd adsorbs at all coverages primarily by substitutional replacement of top layer Cu atoms forming a 2-dimensional CuxPd1-x surface alloy. At low coverages a quasi-random substitutionally disordered 2-dimensional alloy is formed with local order detected by LEED developing at Pd coverages >0.25 ML. The surface geometry is not strongly coverage dependent with top layer Cu and Pd atoms almost coplanar and the 1st interlayer spacing slightly expanded (3%) with respect to the bulk value.

23) The kinetics of formation and structure of an underlayer alloy. The Cu(1 0 0)-c(2□ 2)-Pd system. Barnes, C. J.; AlShamaileh, E.; Pitkanen, T.; Kaukasoina, P.; Lindroos, M. School of Chemical Sciences, Dublin City University, Glasnevin, Dublin, Ire. Surface Science (2001), 492(1-2), 55-66. Publisher: Elsevier Science B.V., CODEN: SUSCAS ISSN: 0039-6028. Journal written in English. CAN 135:309261 AN 2001:708804 CAPLUS (Copyright (C) 2008 ACS on SciFinder (R))

Abstract

The kinetics and mechanism of an irreversible overlayer to underlayer transition in the Cu(1 0 0)-c(2□2)-Pd surface alloy was investigated by LEED. The activation energy for Pd site switching from the outermost layer to sub-surface (second layer) sites was estd. to be 109 □ 12 kJ mol-1 (1.13 □ 0.12 eV). The structure of the underlayer alloy was examd. quant. by tensor LEED. The Cu(1 0 0)-c(2□2) underlayer is demonstrated to have its origin in substitution of approx. 0.5 ML of Pd into the second layer to form a c(2□2) CuPd underlayer alloy capped by a Cu monolayer (Rp = 0.28). A mixed third layer c(2□2) CuPd layer capped by a Cu double layer may be ruled out. Incorporation of sub-surface Pd into the Cu(1 0 0) surface leads to significant expansion of both the first and second interlayer spacings of □dz12 = +3.3% (0.06 .ANG.) and □Dz23 = +6.6% (0.12 .ANG.) relative to the bulk Cu(1 0 0) interlayer spacing (1.805 .ANG.) leading to a net expansion of the outermost 3 layer slab of 0.18 .ANG..

24) Electroanalysis of Ag+, Hg2+ and Fe3+ by voltammetry at an iodine-coated platinum electrode
By Hourani, Mohammed Khair; Shamayleh, Eihab; Ibrahim, Kafa

From Arab Gulf Journal of Scientific Research (1995), 13(2), 225-38. Language: English, Database: CAPLUS

Voltammetric investigations on iodine-coated platinum electrodes revealed their remarkable inertness towards mol. adsorption, which means suppression of surface processes, interferences and generally the current background in voltammetric measurements. In the present work, iodine-coated platinum electrodes were prepd. by potentiostatic adsorption of iodine at 0.20 V from 1 mM KI soln. in 1.0 M HClO4. The passive potential window (the working potential range) in 1.0 M HClO4 was approx. from - 0.20 to 0.9 V. Electroanal. of Ag+, Hg2+ and Fe3+ by cyclic voltammetry showed the existence of a linear relationship between the peak current on the E-i curves and the bulk concn. of the ions.