

# In Catilinam IV: A murder in 5 acts<sup>1</sup>

Marcus Tullius Cicero<sup>a,2</sup> Julius Caesar<sup>c</sup> Catullus<sup>c</sup> Publius Maro Vergilius<sup>b</sup>

Unknown author<sup>a</sup>

<sup>a</sup>*Buckingham Palace, Paestum*

<sup>b</sup>*The White House, Baiae*

<sup>c</sup>*Senate House, Rome*

---

## Abstract

Cum M. Cicero consul ... ( $\vec{a}$ ) Nonis Decembribus senatum in aede Iovis Statoris consuleret, quid de iis coniurationis Catilinae sociis fieri placeret, qui in custodiam traditi essent, factum est, ut duae potissimum sententiae proponerentur, una D. Silani consulis designati, qui morte multandos illos censebat

Altera C. Caesaris, qui illos publicatis bonis per municipia Italiae distribueudos ac vinculis sempiternis tenendos existimabat. Cum acautem plures senatores ad C. Caesaris quam ad D. Silani sententiam inclinare viderentur, M. Cicero ea, quae infra legitur, oratione Silani sententiam commendare studuit.

*Key words:* Cicero; Catiline; Orations

---

## 1. Introduction

hello<sup>3</sup>

### 1.1. Introduction

#### 1.1.1. Introduction

##### 1.1.1.1. Introduction

$$\theta = (a_1, a_2, \dots)^T$$

(1)

## 2. Introduction

Start with a section

## 3. Thoughts

Start with a list:

- In Catilinam I
- In Catilinam II
- In Catilinam III
- In Catilinam IV

---

<sup>1</sup> This is the history of the paper, etc etc

<sup>2</sup> Partially supported by the Roman Senate

<sup>3</sup> A footnote

#### 4. Introduction

A first section with a reference to (138), as well as (1; 4; 6; 7; 8), and to equation 1

Who is Caesar. . .

Video, patres conscripti, in me omnium vestrum ora atque oculos esse conversos, video vos non solum de vestro ac rei publicae, verum etiam, si id depulsum sit, de meo periculo esse sollicitos. Est mihi iucunda in malis et grata in dolore vestra erga me voluntas, sed eam, per deos immortales, deponite atque obliti salutis meae de vobis ac de vestris liberis cogitate. Mihi si haec condicio consulatus data est, ut omnis acerbitates, onunis dolores cruciatusque perferrem, feram non solum fortiter, verum etiam lubenter, dum modo meis laboribus vobis populoque Romano dignitas salusque pariat.

Ego sum ille consul, patres conscripti, cui non forum, iu quo omnis aequitas continetur, non campus consularibus auspiciis consecratus, non curia, summum auxilium omnium gentium, non domus, commune perfugium, non lectus ad quietem datus, non denique haec sedes honoris [sella curulis] umquam vacua mortis periculo atque insidiis fuit. Ego multa tacui, multa pertuli, multa concessi, multa meo quodam dolore in vestro timore sanavi. Nunc si hunc exitum consulatus mei di immortales esse voluerunt, ut vos populumque Romanum ex caede miserrima, coniuges liberosque vestros virginesque Vestales ex acerbissima vexatione, templa atque delubra, hanc pulcherrimam patriam omnium nostrum ex foedissima flamma, totam Italiam ex bello et vastitate eriperem, quaecumque mihi uni proponetur fortuna, subear.<sup>4</sup> Etenim, si P. Lentulus suum nomen inductus a vatibus fatale ad perniciem rei publicae fore putavit, cur<sup>5</sup> ego non laeter meum consulatum ad salutem populi Romani prope fatalem extitisse?

Figure 1 is not by Cicero.

<sup>4</sup> no, not sub-eating.

<sup>5</sup> Not a dog, but a footnote.

*Fear no more the heat o' the sun,  
Nor the furious winter's rages;  
Thou thy worldly task hast done,  
Home art gone, and ta'en thy wages:  
Golden lads and girls all must,  
As chimney-sweepers, come to dust.  
Fear no more the frown o' the great;  
Thou art past the tyrant's stroke;  
Care no more to clothe and eat;  
To thee the reed is as the oak:  
The sceptre, learning, physic, must  
All follow this, and come to dust.  
Fear no more the lightning flash,  
Nor the all-dreaded thunder-stone;  
Fear not slander, censure rash;  
Thou hast finish'd joy and moan:*

*All lovers young, all lovers must  
Consign to thee, and come to dust.*

*No exorciser harm thee!  
Nor no witchcraft charm thee!  
Ghost unlaid forbear thee!  
Nothing ill come near thee!  
Quiet consummation have;  
And renowned be thy grave!*

Fig. 1. A Song, by William Shakespeare from his play *Cymbeline*, performed by two characters called Guiderius and Arviragus

#### 5. The argument

Some words might be appropriate describing equation 2.

$$\frac{\partial F}{\partial t} = D \frac{\partial^2 F}{\partial x^2}, \quad (2)$$

$$x = 1 \quad (3)$$

$$y = 2 \quad (4)$$

$$z = 3 \quad (5)$$

Quare, patres conscripti, consulite vobis, prospicite patriae, conservate vos, coniuges, liberos fortunasque vestras, populi Romani nomen salutemque defendite; mihi parcere ac de me cogitare desinite. Nam primum debeo sperare omnis

Table 1

Defect parameters for AgCl(111) surfaces<sup>#</sup>

$\Delta_j H_S^\circ,$ $\Delta_j S_S^\circ$	Conductivity Profile analysis		
	(129)		(87)*
$\Delta_i H_S^\circ/\text{meV}$	370	800	780
$\Delta_i S_S^\circ/k$	4.7	10	9.2
$\Delta_v H_S^\circ/\text{meV}$	880	600	690
$\Delta_v S_S^\circ/k$	2.0	0	0.6

<sup>#</sup> The evaluation relies on an  $\text{Ag}_i^\cdot$  accumulation which is in agreement with the literature but which is still under debate (see text) (132; 133).

\* A recent reevaluation resulted particularly in different entropy values. (118).

deos, qui huic urbi praesident, pro eo mihi, ac mereor, relatores esse gratiam; deinde, si quid obtigerit, aequo animo paratoque moriar. Nam neque turpis mors forti viro potest accidere neque immatura consulari nec misera sapienti. Nec tamen ego sum ille ferreus, qui fratris carissimi atque amantissimi praesentis maerore non movear horumque omnium lacrimis, a quibus me circum-sessum videtis Neque meam mentem non domum saepe revocat exanimata uxor et abiecta metu filia et parvulus filius quem mihi videtur amplecti res publica tamquam ob sidem consulatus mei, neque ille, qui expectans huius exitum diei stat in conspectu meo, gener. Moveo his rebus omnibus, sed in eam partem, uti salvi sint vobiscum omnes, etiamsi me vis aliqua oppresserit, potius, quam et illi et nos una rei publicae peste pereamus.

Quare, patres conscripti, incumbite ad salutem rei publicae, circumspicite omnes procellas, quae inpendent, nisi providetis. Non Ti. Gracchus, quod iterum tribunus plebis fieri voluit, non C. Gracchus, quod agrarios concitare conatus est, non L. Saturninus, quod C. Memmii occidit, in discrimen aliquod atque in vestrae severitatis iudicium adducitur tenentur ii, qui ad urbis incendium, ad vestram omnium caedem, ad Catilinam accipiendum Romae restiterunt, tenentur litterae, signa, manus, denique unius cuiusque confessio; sollicitantur Allobroges, servitia excitantur, Catilina accersitur; id est initum consilium, ut interfectis omnibus nemo ne ad deplorandum quidem populi Romani nomen atque ad lamentandam tanti imperii calamitatem relinquantur.

Haec omnia indices detulerunt, rei confessi sunt, vos multis iam iudiciis iudicavistis, primum quod mihi gratias egistis singulis laribus verbis et mea virtute atque diligentia perditorum hominum coniurationem patefactam esse decrevistis, deinde quod P. Lentulus se abdicare praetura coegistis, tum quod eum et ceteros, de quibus iudicavistis, in custodiam dandos censuistis, maximeque quod meo nomine supplicationem decrevistis, qui honos togato habitus ante me est nemini; postremo hesterno die praemia legatis Allobrogum Titoque Volturcio dedistis amplissima. Quae sunt omnia eius modi, ut ii, qui in custodiam nominatim dati sunt, sine ulla dubitatione a vobis damnati esse videantur.

### 5.1. A sub section

Also containing some text, and a figure. Also containing some text, and a figure Also containing some text, and a figure Also containing some text, and a figure (2).

### 5.2. Another sub section

#### 5.2.1. A subsub section

with some text in it.

#### 5.2.2. Another subsub section

with some text in it.

#### 5.2.2.1. And a paragraph (ie a sub sub subsection)

Leave 3cm of space for non-electronic graphic on full page width:

Fig. 2. A Caption

### 5.3. Another sub section

## 6. Epilogue

A word or two to conclude, and this even includes some inline maths:  $R(x, t) \sim t^{-\beta} g(x/t^\alpha) \exp(-|x|/t^\alpha)$

Quae cum ita sint, pro imperio, pro exercitu, pro provincia, quam neglexi, pro triumpho ceterisque laudis insignibus, quae sunt a me propter urbis vestraeque salutis custodiam repudiata, pro clientelis hospitiisque provincialibus, quae tamen urbanis opibus non minore labore tueor quam comparo, pro his igitur omnibus rebus, pro meis in vos singularibus studiis proque hac, quam perspicitis, ad conservandam rem publicam diligentia nihil a vobis nisi huius temporis totiusque mei consulatus memoriam postulo; quae dum erit in vestris fixa mentibus, tutissimo me muro saeptum esse arbitror.<sup>6</sup> Quodsi meam spem vis inproborum fefellerit atque superaverit, commendo vobis parvum meum filium, cui profecto satis erit praesidii non solum ad salutem, verum etiam ad dignitatem, si eius, qui haec omnia suo solius periculo conservavit, illum filium esse memineritis.

Quapropter de summa salute vestra populi que Romani, de vestris coniugibus ac liberis, de aris ac focus, de fanis atque templis de totius urbis tectis ac sedibus, de imperio ac libertate, de salute Italiae, de universa re publica decernite diligenter, ut instituistis, ac fortiter. Habetis eum consulem, qui et parere vestris decretis non dubitet et ea, quae statueritis, quoad vivet, defendere et per se ipsum praestare possit.

now for a vec, as in  $\vec{66}$

## References

- [1] C.C. Liang, *J. Electrochem. Soc.* **120** (1973) 1298.
- [2] J.B. Wagner, *High Conductivity Conductors Solid Ionic Conductors*, T. Takahashi, ed., World Scientific, Singapore, 1989; A. Shukla, N. Vaidehi, K.T. Jacob, *Proc. Indian Acad. Sci.* **96** (1986) 533.
- [3] a) J. Maier, *Ber. Bunsenges. Phys. Chem.* **88** (1984) 1057; b) *phys. stat. sol. B* **123** (1984) K89, K187; c) *Mater. Sci. Monogr.* **28A** (1985) 419; d) *Structure Relations in Fast Ion and Mixed Conductors*, F. W. Poulsen et al., eds. Risø Nat. Lab., 1986, Roskilde p. 153; e) *Solid State Ionics* **32/33** (1989) 727; f) *Solid State Ionics* **18/19** (1986) 1141.
- [4] J. Maier, *J. Electrochem. Soc.* **134** (1987) 1524; *Solid State Ionics: Materials and Applications*, S. Chandra, B.V.R. Chowdari, eds., World Scientific, Singapore, 1992, p. 111.
- [5] N.J. Dudney, *Ann. Rev. Mat. Sci.* **19** (1989) 103.
- [6] J. Maier, *J. Phys. Chem. Solids* **46** (1985) 309.
- [7] J. Maier, *Ber. Bunsenges. Phys. Chem.* **89** (1985) 355.
- [8] a) J. Maier, *Mater. Res. Bull.* **20** (1985) 383; b) J. Maier, B. Reichert, *Ber. Bunsenges. Phys. Chem.* **90** (1986) 666.
- [9] J. Maier, *Ber. Bunsenges. Phys. Chem.* **90** (1986) 26.
- [10] a) J. Maier, *Solid State Ionics* **23** (1987) 59; b) *phys. stat. sol. (a)* **112** (1989) 115.
- [11] J. Maier, *Ber. Bunsenges. Phys. Chem.* **93** (1989) 1468; *Ber. Bunsenges. Phys. Chem.* **93** (1989) 1474; *Solid State Ionics* **28-30**

<sup>6</sup> Cicero wrote very long sentences...

- (1988) 1073.
- [12] J. Maier, S. Prill, B. Reichert, *Solid State Ionics* **28-30** (1988) 1465.
  - [13] J. Maier, *Mater. Chem. Phys.* **17** (1987) 485; *Superionic Solid and Solid Electrolytes, Recent Trends*, A.L. Laskar, S. Chandra, eds., Academic Press, New York, 1989, p. 137; in *Science and Technology of Fast Ion Conductors*, H.L. Tuller, Ed. Plenum Press, New York 1989, p. 345.
  - [14] J. Maier, *Angew. Chem. Int. Ed. Engl.* **32**(3) (1993) 313; *Angew. Chem. Int. Ed. Engl.*, **32**(4) (1993) 528; in *Defects in Insulating Materials*, O. Kanert and J.-M. Spaeth, eds., World Scientific, Singapore, 1992, p. 2.
  - [15] J. Wassermann, T.P. Martin, J. Maier, *Solid State Ionics* **28-30** (1988) 1514.
  - [16] U. Lauer, J. Maier, *Ber. Bunsenges. Phys. Chem.* **96**, (1992) 111; *Solid State Ionics* **51** (1992) 209.
  - [17] J. Maier, U. Lauer, *Ber. Bunsenges. Phys. Chem.* **94** (1990) 973; U. Lauer, J. Maier, W. Göpel, *Sensors and Actuators B* **2** (1990) 125; *Solid State Ionics* **40/41** (1990) 463.
  - [18] P. Murugaraj and J. Maier, *Solid State Ionics* **32/33** (1989) 993; *Solid State Ionics* **40/41** (1990) 1017.
  - [19] U. Lauer and J. Maier, *J. Electrochem. Soc.* **139**(5) (1992) 1472.
  - [20] A. Atkinson, R.I. Taylor, *Phil. Mag.* A43 979; *Solid State Ionics* **28-30** (1988) 1377.
  - [21] T. Asai, S. Kawai, *Solid State Ionics* **20** (1986) 225.
  - [22] T. Asai, C.-H. Hu, S. Kawai, *Mater. Res. Bull.* **22**, (1987) 269.
  - [23] L. Chen, Z. Zhao, G. Wang, Z. Li, *Kexue Tongbao* **26** (1981) 308.
  - [24] M.R.-W. Chang, K. Shahi, J.B. Wagner, *J. Electrochem. Soc.* **131** (1984) 1213.
  - [25] P. Chowdhary, V.B. Tare, J.B. Wagner, *J. Electrochem. Soc.* **132** (1985) 123.
  - [26] P. Chowdhary, J.B. Wagner, *Mater. Lett.* **3** (1985) 78.
  - [27] P. Chowdhary, A. Khandkar, J.B. Wagner, The Electrochemical Society Meeting, October 1985, Las Vegas.
  - [28] R. Dupree, J.R. Howells, A. Hooper, F.W. Poulsen, *Solid State Ionics* **3/4** (1981) 277.
  - [29] P. Dubec, J.B. Wagner, *Mater. Lett.* **2** (1984) 302.
  - [30] A. Hooper, *J. Power Sources* **9** (1983) 161.
  - [31] T.R. Jow, C.C. Liang, *Solid State Ionics* **9/10** (1983) 695.
  - [32] T. Jow, J.B. Wagner, *J. Electrochem. Soc.* **126**(1979) 1963.
  - [33] A. Khandkar, J.B. Wagner, The Electrochem. Soc. Meeting, San Francisco, 1983; A. Khandkar, Thesis, 1985, Arizona State University.
  - [34] C.C. Liang, A.V. Joshi, N.E. Hamilton, *J. Applied Electrochem.* **8** (1978) 445.
  - [35] O. Nakamura, J.B. Goodenough, *Solid State Ionics* **7** (1982) 125.
  - [36] S. Pack, B. Owens, J.B. Wagner, *J. Electrochem. Soc.* **127** (1980) 2177.
  - [37] F.W. Poulsen, N.H. Andersen, B. Kindl, J. Schoonman, *Solid State Ionics* **9/10** (1983) 131.
  - [38] F.W. Poulsen, *Solid State Ionics* **2** (1981) 53.
  - [39] F.W. Poulsen and P.J. Møller in: loc. cit. [3d], p. 159.
  - [40] F.W. Poulsen in: loc. cit. [3d], p. 67.
  - [41] J.B. Phipps, D.H. Whitmore, *Solid State Ionics* **9/10** (1983) 123.
  - [42] J.B. Phipps, D.H. Whitmore, *J. Power Sources* **9** (1983) 373.
  - [43] P.M. Skarstadt, D.B. Merritt, B.B. Owens, *Solid State Ionics* **314** (1981) 277.
  - [44] K. Shahi, J.B. Wagner, *J. Phys. Chem. Solids* **43**, (1982) 713.
  - [45] K. Shahi, J.B. Wagner, *J. Solid State Chem.* **42** (1982) 107.
  - [46] K. Shahi, J.B. Wagner, *J. Electrochem. Soc.* **128** (1981) 6.
  - [47] J.B. Wagner, *Mater. Res. Bull.* **15** (1980) 1691.
  - [48] Z. Zhao, C. Wang, L. Chen, *Wuli Xuebao* **33** (1984) 1205; Z. Zhao, C. Wang, S. Dai, L. Chen, *Solid State Ionics* **9/10** (1983) 1175.
  - [49] S. Fujitsu, M. Miyayama, K. Koumoto, H. Janagida, T. Kanazawa, *J. Mater. Sci.* **20** (1985) 2103.
  - [50] S. Fujitsu, K. Kuomoto, H. Janagida, *Solid State Ionics* **18/19** (1986) 1146.
  - [51] A. Khandkar, V.B. Tare, J.B. Wagner, *Rev. Chim. Min.* **23** (1986) 274.

- [52] N. Vaidehi, R. Akila, A.K. Shukla, K.T. Jacob, *Mater. Res. Bull.* **21** (1986) 909.
- [53] E. Hartmann, V.V. Peller, G.I. Rogalski, *Solid State Ionics* **28-30** (1988) 1098, V. Trnovcová, C. Bárta, P.P. Fedorov, I. Zibrov, *Materials Science Forum* **76** (1991) 13, S. Adams, K. Hariharan, J. Maier, *Solid State Ionics*, bf 75 (1991) 193, Y. He, Z. Chen, Z. Zhang, L. Wang and L. Chen in *Materials for Solid State Batteries*, B.V.R. Chowdhari and S. Radhakrishna, eds., World Scientific, Singapore, 1986, p. 333., J. R. Stevens and B.E. Mellander, *Solid State Ionics* **21** (1986) 203, S. Skaarup, K. West and B. Zachau Christiansen, *Solid State Ionics* **28-30** (1989) 975, J. Plochanski, W. Wiecezorek, J. Przyluski and K. Such, *J. Appl. Phys. A* **49** (1989) 55, W. Wiecezorek, K. Such, H. Wycislik and J. Plochanski, *Solid State Ionics* **36** (1989) 255, J. Plochanski and W. Wiecezorek, *Solid State Ionics* **28-30** 979; (1988)
- Y. Saito, T. Asai, K. Ado and O. Nakamura, *Mat. Res. Bull.* **23** (1988) 1661, Y. Saito, T. Asai, O. Nakamura and Y. Yamamoto, *Solid State Ionics* **35** (1989) 241, Y. Saito, J. Mayne, K. Ado, Y. Yamamoto and O. Nakamura, *Solid State Ionics* **40/41** (1990) 72, J. Mayne, Y. Saito, H. Kageyama, K. Ado, T. Asai and O. Nakamura, *Solid State Ionics* **40/41** (1990) 67, Y. Saito, K. Ado, T. Asai, H. Kageyama, O. Nakamura and Y. Yamamoto, *Solid State Ionics* **53-56** (1992) 728, O. Nakamura and Y. Saito, *Solid State Ionics: Materials and Applications*, S. Chandra, S. Singh and P.C. Srivastava, eds., World Scientific, Singapore, 1992, p. 101;
- B. Wnetrzewski, J.L. Nowinski and W. Jakubowski, *Solid State Ionics* **36** (1989) 209, P. Weslowski, W. Jakubowski and J.L. Nowinski, *phys. stat. sol. (a)* **115** (1989) 81, J.L. Nowinski, P. Kurek and W. Jakubowski, *Solid State Ionics* **36** (1989) 213; P. Kurek, J.L. Nowinski and W. Jakubowski, *Solid State Ionics* **36** (1989) 243; H. Husono and Y. Abe *Solid State Ionics*, **44** (1990) 293; B. Kumar, J.D. Schaffer, M. Nookola, L. G. Scanlou, *J. Power Sources* **47** (1994) 63; S.N. Reddy, A.S. Chary, K. Saibabu, T. Chiranjui, A. Brune, J.B. Wagner, *Solid State Ionics* **25** (1987) 165, K. Singh, S.S. Bhoga *Solid State Ionics* **39** (1990) 205; S.S. Bhoga, K. Singh *Solid State Ionics* **40/41** (1990) 27, S. Chaklanobis, K. Shahi, R.K. Syal *Solid State Ionics* **44** (1990) 107, L. Chen, C. Gros, R. Castaynet, P. Hagenmuller *Solid State Ionics* **31** (1988) 209.
- [54] G. Simkovich, C. Wagner, *J. Catalysis* **1** (1962) 521.
- [55] T.L. Wen, R.A. Huggins, A. Rabenau, W. Weppner, *Rev. Chim. Min.* **20** (1983) 40.
- [56] Y. Saito, J. Maier, in preparation; Y. Saito, K. Hariharan, J. Maier, *Proc. 4th Int. Symp. on Syst. with Fast Ionic Transport*, Warsaw, 1994, in press.
- [57] K. Hariharan, J. Maier, *J. Electrochem. Soc.*, submitted.
- [58] A.M. Stoneham, E. Walde, J.A. Kilner, *Mater. Res. Bull.* **14** (1979) 1661.
- [59] K. Shahi, J.B. Wagner, *Appl. Phys. Lett.* **37** (1980) 757.
- [60] N.J. Dudney, *J. Am. Ceram. Soc.* **70** (1987) 65.
- [61] C. Wagner, *J. Phys. Chem. Solids* **33** (1972) 1051.
- [62] A. Bunde, W. Dieterich, E. Roman, *Solid State Ionics* **18/19** (1986) 147.
- [63] H.E. Roman, A. Bunde, W. Dieterich: loc. cit. [3d], p. 165.
- [64] H.E. Roman, A. Bunde, W. Dieterich, *Phys. Rev.* **B34** (1986) 331.
- [65] J.C. Wang, N.J. Dudney, *Solid State Ionics* **18/19** (1986) 112.
- [66] H. Schmalzried, *Solid State Reactions*. Verlag Chemie, Weinheim, 1981.
- [67] J. Frenkel, *Kinetic Theory of Liquids*. Oxford University Press, New York, 1946.
- [68] K.L. Kliewer, J.S. Köhler, *Phys. Rev.* **A 140** (1965) 1226; C. Newey, P. Pratt, A. Lidiard, *Phil. Mag.* **3** (1958) 75.
- [69] R.B. Poeppel, J.M. Blakely, *Surf. Sci.* **15** (1969) 507.
- [70] J. Maier, in *Science and Technology of Fast Ion Conductors*. H.L. Tuller, M. Balkanski, Eds. Plenum Press, New York, 1989, p. 299.
- [71] J. Jamnik, J. Maier and S. Pejovnik *Solid State Ionics*, in press.

- [72] J.R. Macdonald, D.R. Franceschetti and A.P. Lehen, *J. Chem. Phys.* **73** (1980) 5272; J.R. Macdonald and A.P. Lehen, *Cryst. Latt. Def.* **9** (1982) 149.
- [73] J. Maier, W. Göpel, *J. Solid State Chem.* **72** (1988) 293; W. Göpel, J. Maier, K. Schierbaum, and H.-D. Wiemhöfer, *Solid State Ionics* **32/33** (1989) 440.
- [74] J. Maier, U. Lauer, *Solid State Ionics* **51** (1992) 209.
- [75] J. Jamnik, J. Maier and S. Pejovnik, *Solid State Ionics* **75** (1995) 51; *Electrochimica Acta*, **14** (1993) 1975; J. Jamnik, J. Maier and S. Pejovnik, *Proc. 1st Int. Slovenian-German Seminar of Joints Projects in Mat. Sci. and Technol.*, Ljubljana, October 94, to be published; J. Fleig and J. Maier, *Proc. 1st Int. Slovenian-German Seminar of Joints Projects in Mat. Sci. and Technol.*, Ljubljana, October 94, to be published.
- [76] H. Böttger, V.V. Bryksin, *Hopping Conduction in Solids*. VCH, Weinheim, 1985.
- [77] R. Blender, W. Dieterich, *Solid State Ionics*, **28-30** (1988) 82.
- [78] M. Kleitz, H. Bernard, E. Fernandez, E. Schrouter, *Adv. Ceram. Sci. Tech. Zirconia* **3** (1981) 310; H. Rickert, U. Schwaitzer, *Solid State Ionics* **9/10** (1983) 689; H. J. Queisser, J.H. Werner, *Mat. Res. Soc. Symp. Proc.* (1988) 53; H. J. M"oller, H. P. Strunk, J. Werner eds., *Polycrystalline Semiconductors*, Springer, Berlin, 1989.
- [79] J. Fleig, Ph D-Thesis, Tübingen-Stuttgart, 1995 (detailed calculation of such effects by finite elements); J. Fleig, J. Maier, in preparation.
- [80] R.E. Soltis, E.M. Logothetis, A.D. Brailsford, J.B. Wagner, *J. Electrochem. Soc.* **135** (1988) 2380; A.D. Brailsford, *Solid State Ionics* **21** (1986) 159; N.F. Uvarov, E.F. Hairtadinov, J.M. Reau, P. Hagenmuller, *Solid State Comm.* **79** (1991) 635.
- [81] N.F. Uvarov and J. Maier, *Solid State Ionics*, **62** (1993) 251.
- [82] N.F. Uvarov, V.P. Isopov, V. Sharma, A.K. Shukla *Solid State Ionics* **51** (1992) 41.
- [83] G.E. Pike, private communication.
- [84] Y.M. Chiang, A.F. Henriksen, W.D. Kingery, D. Finello, *J. Am. Ceram. Soc.* **64** (1981) 385.
- [85] P. Sutton, private communication.
- [86] K.L. Kliewer, *J. Phys. Chem. Solids* **27** (1966) 705.
- [87] G. Farlow, A.B. Blose, Sr.J. Feldott, B.D. Lounsberry, L. Slifkin, *Radiation Eff.* **75** (1983) 1; Sr. J. Feldott, A.B. Blose, B.D. Lounsberry, L. Slifkin, *J. Imag. Sci.* **29** (1985) 39; R.A. Hudson, G.C. Farlow, L.M. Slifkin, manuscript.
- [88] U. Riedel, J. Maier, and R. Brook, *J. Eur. Ceram. Soc.* **9**(3) (1992) 205; *Solid State Ionics*, M. Balkanski, T. Takahashi, H.L. Tuller, Eds. Elsevier Science Publishers, Amsterdam, 1992 p. 259.
- [89] P.W. Tasker *Advances in Ceramics* **10** (1984) 176.
- [90] L. Bousse, N.F. de Rooij, P. Bergveld, *Trans. Electron. Dev.* **30** (1983) 1263.
- [91] A. van der Berg, P. Bergveld, D.N. Reinhardt, E.J.B. Sudh"alter, *Sens. Actuat.* **8** (1985) 129.
- [92] E.A. Daniels, S.M. Rao, *Z. Phys. Chem.* **N. F. 137** (1983) 247.
- [93] S.M. Rao, *Ph. D. Thesis*, 1983, Poona University.
- [94] J.L. White in: *Proc. 4th Nat. Conf. Clays and Clay Min., Int. Ser. Monogr. Earth Sciences*, p. 133.
- [95] C. Zipelli, J.C.J. Bart, C. Petrini, S. Galvagno, C. Cimino, *Z. Anorg. allg. Chem.* **502** (1983) 199.
- [96] J. Maier, G. Schwitzgebel, *Mater. Res. Bull.* **17** (1982) 1061; J. Maier, *Solid State Ionics* **32/33** (1989) 727.
- [97] J. Mizusaki, K. Fueki, *Solid State Ionics* **6** (1982) 55.
- [98] O. Stasiw, J. Teltow, *Ann. Phys. (Lpz.)* **1** (1947) 261.
- [99] D. Müller, *phys. stat. sol.* **1312** (1965) 775.
- [100] J. Maier, *Z. Phys. Chem.* **N.F. 140** (1984) 191; *J. Am. Ceram. Soc.*, **76**(5) (1993) 1212; *J. Am. Ceram. Soc.*, **76**(5) (1993) 1218; *J. Am. Ceram. Soc.*, **76**(5) (1993) 1223; *J. Am. Ceram. Soc.*, **76**(5) (1993) 1228.
- [101] N. Valverde-Diez, J.B. Wagner, Jr., *Solid State Ionics*, **28-30** (1988) 1697.

- [102] J. Maier, *Solid State Ionics*, **62** (1993) 105.
- [103] N.F. Uvarov, M.C.R. Shastri and K.J. Rao *Rev. Solid State Sci.* **4** (1990) 61.
- [104] J.A. Schmidt, J.C. Bazán, L. Vico, *Solid State Ionics* **27** (1988) 1.
- [105] Y. Haven, *Rec. Tran. Chem.* **69** (1950) 1471, 1505.
- [106] M. Mogensen, *J. Power Sources* **20** (1987) 53; M. Gabersček, J. Jamnik, S. Pejovnik, *J. Electrochem. Soc.* **140** (1993) 308.
- [107] B. Zhu, B.E. Mellander, in: C. Singhal and H. Iwahara, eds. *Solid Oxide Fuel Cells* (The Electrochemical Soc. Inc., Pennington, NJ, 1993) 156.
- [108] T. Unruh, Ph D-Thesis, Saarbrücken, FRG (1995)
- [109] E. Gianellis, *Solid State Ionics*, in press.
- [110] R.A. Hubermann, *Phys. Rev. Lett.* **32** (1974) 1000.
- [111] N. Hainovsky, J. Maier, *Solid State Ionics*, in press; *Phys. Rev.*, in press.
- [112] R. Lipowski, *Phys. Rev. Lett.* **49** (1982) 1575; V.N. Bondarev and A.B. Kuklov, *Solid State Ionics* **44** (1991) 145.
- [113] G. Ertl, J. Küppers, *Low Energy Electrons and Surface Chemistry*. VCH, Weinheim, 1985.
- [114] W.D. Kingery, *Mater. Sci. Monogr.* **28A** (1985) 25.
- [115] J.-E. Gerner, Diploma Thesis, 1984, University of Konstanz.
- [116] J.H. Strange, S.M. Rageb, R.C.T. Slade, *Phil. Mag.* **A 64** (1991) 1159.
- [117] R.A. Hudson, G.C. Farlow and L.M. Slifkin *Phys. Rev. B* **36** (1987) 4651.
- [118] L. Slifkin, personal communication; S.K. Wonnell and L.M. Slifkin *Phys. Rev. B* **48** (1993) 78.
- [119] J. Fleig, J. Jamnik, J. Maier, in preparation.
- [120] J. Jamnik, H.-U. Habermeier, J. Maier, *Physica B* **204** (1995) 57.
- [121] M. Kleitz, *Solid State Ionics* **3/4** (1981) 513.
- [122] S. Gupka, S. Patnaik, K. Shahi, *Solid State Ionics* **31** (1) (1988) 5.
- [123] U. Lauer, Ph D thesis, University of Tübingen, 1991.
- [124] F. Granzer, *J. Imag. Sci.* **33** (1989) 207.
- [125] J.T. Overbeek in: *Colloid Science I*, H. R. Kruyt, Ed. Elsevier, Amsterdam, 1952.
- [126] R.C. Baetzold, J.F. Hamilton, *Surf. Sci.* **33** (1972) 461.
- [127] R.C. Baetzold, *J. Phys. Chem. Solids* **35** (1974) 89.
- [128] H.A. Hoyer, *J. Appl. Phys.* **47** (1976) 3784.
- [129] N. Starbov, *J. Inf. Rec. Mater.* **13** (1985) 307.
- [130] Y.T. Yan, H.A. Hoyer, *Surf. Sci.* **36** (1973) 242.
- [131] S. Mühlherr, K. Läger, N. Nicoloso, E. Schreck, K. Dransfeld, *Solid State Ionics* **28-30** (1988) 1495.
- [132] J. Jamnik, Ph D-Thesis, Ljubljana-Stuttgart, 1994.
- [133] J. Fleig and J. Maier, in preparation.
- [134] W. Göpel, U. Lampe, *Phys. Rev. B* **22** (1980) 6447.
- [135] E. Schreck, K. Läger, K. Dransfeld, *Z. Phys.* **B62** (1986) 331.
- [136] J.B. Phipps, D.L. Johnson, D.H. Whitmore, *Solid State Ionics* **5** (1981) 393.
- [137] J. Corish, P.W.M. Jacobs, *Surf. Def. Prop. Solids* **2** (1973) 160.
- [138] W. Puin, P. Heitjans, *Proc. Int. Conf. Nanocryst. Mater.*, Stuttgart, 1994, in press; W. Puin, P. Heitjans, J. Maier, in preparation.
- [139] S. Chandra, private communication.
- [140] W. Göpel, *Progr. Surf. Sci.* **20** (1986) 1.
- [141] M. v. Smoluchowski, *Z. Phys. Chem.* **92**, 129 (1917).

Fig. A.1. see equation A.1

## Appendix A. APPENDIX

$$a + b = c \quad (\text{A.1})$$