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## Research interests

Nanophysics, Materials Physics, Biomaterials, Hard-Soft-Matter interfaces

## Employment

### Lecturer

Lecturer  
Physics  
University of York  
Heslington, York  
1 Oct 2007 → 30 Sept 2013

### Reader

Reader  
Physics  
University of York  
Heslington, York  
1 Oct 2013 → 30 Sept 2019

### Professor

Professor  
Physics  
University of York  
Heslington, York  
1 Oct 2019 → present

## Research outputs

### **Contrasting the Effects of Aspartic Acid and Glycine in Free Amino Acid and Peptide Forms on the Growth Rate, Morphology, Composition, and Structure of Synthetic Aragonites**

Gardella, G., Castillo Alvarez, M. C., Presslee, S., Finch, A. A., Penkman, K., Kröger, R., Clog, M. & Allison, N., 3 Nov 2024, (E-pub ahead of print) In: *Crystal Growth and Design*. 12 p.

### **$\text{B(OH)}_4^-$ and $\text{CO}_3^{2-}$ do not compete for incorporation into aragonite in synthetic precipitations at $\text{pH}_{\text{total}}$ 8.20 and 8.41 but do compete at $\text{pH}_{\text{total}}$ 8.59**

Castillo Alvarez, C., Penkman, K., Kröger, R., Finch, A. A., Clog, M., Hathorne, E. & Allison, N., 15 Aug 2024, In: *Geochimica et Cosmochimica Acta*. 379, p. 39-52 14 p.

### **The influence of seawater $\text{pCO}_2$ and temperature on the amino acid composition and aragonite $\text{CO}_3$ disorder of coral skeletons**

Allison, N., Ross, P., Castillo Alvarez, C., Penkman, K., Kröger, R., Kellock, C., Cole, C., Clog, M., Evans, D., Hintz, C., Hintz, K. & Finch, A. A., 14 Aug 2024, (E-pub ahead of print) In: *Coral reefs*. 13 p.

### **Insights into the response of coral biomineralisation to environmental change from aragonite precipitations in vitro**

Castillo Alvarez, C., Penkman, K., Kröger, R., Finch, A. A., Clog, M., Brasier, A., Still, J. & Allison, N., 1 Jan 2024, In: *Geochimica et Cosmochimica Acta*. 364, p. 184-194 11 p.

**An experimental study of wet-cooking in organic vessels: implications for understanding the evolution of cooking technologies**

Little, A. P., Needham, A., Langley, A., Lucquin, A. J. A. & Kröger, R., 30 Aug 2023, In: Archaeological and Anthropological Sciences. 15, 17 p., 142.

**Using Combination of X-Ray 3D Tomography and FEG-SEM to Perform 3D-FIB Reconstruction in Identified Area to Investigate Effect of Mining Contamination on Scallop Shell Growth**

Guichaoua, L., Bessette, S., Stewart, B., Reznikov, N., Kröger, R. & Gauvin, R., 22 Jul 2023, In: Microscopy and Microanalysis. 29, Supplement\_1, p. 560-561 2 p.

**Optimising a method for aragonite precipitation in simulated biogenic calcification media**

Kellock, C., Alvarez, M. C. C., Finch, A., Penkman, K., Kröger, R., Clog, M. & Allison, N., 2 Dec 2022, In: PLoS ONE. 17, 12, 18 p., e0278627.

**Enhancing strength in mineralized collagen**

Nudelman, F. & Kröger, R., 7 Apr 2022, In: Science (New York, N.Y.). 376, 6589, p. 137-138 2 p.

**Controls on Sr partitioning in aragonite under simulated biogenic conditions**

Castillo Alvarez, M. C., Penkman, K. E. H., Kröger, R., Finch, A., Clog, M., Hathorne, E. C. & Allison, N., 2022.

**Hierarchical organization of bone in three dimensions: A twist of twists**

Buss, D. J., Kröger, R., McKee, M. D. & Reznikov, N., 2022, In: JOURNAL OF STRUCTURAL BIOLOGY. 6, 2022, 10 p., 100057.

**Metal pollution as a potential threat to shell strength and survival in marine bivalves**

Stewart, B. D., Boig, C., Jenkins, S., Sinfield, C., Kennington, K., Lart, W., Brand, A. & Kröger, R., Feb 2021, In: Science of the Total Environment. 755, part 1, 10 p., 143019.

**The role of aspartic acid in reducing coral calcification under ocean acidification conditions**

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**Trace and major element incorporation into amorphous calcium carbonate (ACC) precipitated from seawater**

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**Metal pollution is leaving scallops helpless against crabs and lobsters**

Stewart, B. D. & Kröger, R., 5 Nov 2020, The Conversation.

**Nanostructure of Mouse Otoconia**

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**Shape-controlled synthesis and in situ characterisation of anisotropic Au nanomaterials using liquid cell transmission electron microscopy**

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**Time-Resolved in situ Raman Spectroscopic Observations of a Biomineralization Model System**

Wingender, B., Tong, E., Emery, J., Gower, L. & Kröger, R., 5 Aug 2019, In: Microscopy and Microanalysis. p. 826-827

**The Characteristics and Biological Relevance of Inorganic Amorphous Calcium Carbonate (ACC) Precipitated from Seawater**

Evans, D., Webb, P. B., Penkman, K., Kröger, R. & Allison, N., 3 Jul 2019, In: CRYSTAL GROWTH DESIGN.

**On Biomineralization: Enzymes Switch on Mesocrystal Assembly**

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**Our bones: strength, flexibility and...fractals!**

Kröger, R. & Reznikov, N., Nov 2018, In: TheScienceBreaker.

**Misleading residues on lithics from Star Carr: identification with Raman microspectroscopy**

Croft, S. C. K., Chatzipanagis, K., Kröger, R. & Milner, N., Jun 2018, In: Journal of archaeological science. 19, p. 430-438 9 p.

**"On demand" triggered crystallization of CaCO<sub>3</sub> from solute precursor species stabilized by the water-in-oil microemulsion**

Stawski, T., Roncal-Herrero, T., Fernandez-Martinez, A., Veloza, A. M., Kröger, R. & Bening, L., 10 May 2018, In: Physical Chemistry Chemical Physics. 11 p.

**Fractal-like hierarchical organization of bone begins at the nanoscale**

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**Understanding the response of biomineralisation to rising seawater pCO<sub>2</sub>**

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**Glycans modify mesenchymal stem cell differentiation to impact on the function of resulting osteoblasts**

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Croft, S., Kröger, R., Robson, H. K., Rowley, C. C. A., Taylor, B., Jones, A. G., Conneller, C. & Needham, A., 1 Feb 2018, In: Journal of Archaeological Science Reports. 17, p. 650-656 7 p.

**Liquid cell transmission electron microscopy and the impact of confinement on the precipitation from supersaturated solutions**

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**Biomineralization of a titanium-modified hydroxyapatite semiconductor on conductive wool fibers**

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**Protein sequences bound to mineral surfaces persist into deep time**

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**Survival of eggshell peptides over millions of years in Africa is due to mineral binding**

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**Synergistic Biomineralization Phenomena Created by a Combinatorial Nacre Protein Model System**

Chang, E., Roncal-Herrero, T., Morgan, T. L., Dunn, K. E., Rao, A., A.M.R. Kunitake, J., Lui, S., Bilton, M. W., Estroff, L., Kröger, R., Johnson, S. D. & Evans, J., 13 Apr 2016, In: *Biochemistry*. 55, 16, p. 2401-2410 10 p.

**Crystallization of citrate-stabilized amorphous calcium phosphate to nanocrystalline apatite: a surface-mediated transformation**

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**Semiconductor-Metal Nano-Floret Hybrid Structures by Self-Processing Synthesis**

Hazut, O., Waichman, S., Subramani, T., Sarkar, D., Dash, S., Roncal-Herrero, T., Kröger, R. & Yerushalmi, R., 30 Mar 2016, In: *Journal of the American Chemical Society*. 138, 12, p. 4079-4086 8 p.

**A Unique Engraved Shale Pendant from the Site of Star Carr: the oldest Mesolithic art in Britain**

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**Biomineralization: Ion binding and nucleation**

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**Control of gas phase nanoparticle shape and its effect on MRI relaxivity**

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**Testing the effect of bleaching on the bivalve *Glycymeris*: a case study of amino acid geochronology on key Mediterranean raised beach deposits**

Demarchi, B., Clements, E., Coltorti, M., Van De Locht, R., Kröger, R., Penkman, K. E. H. & Rose, J., 2015, In: *Quaternary Geochronology*. 25, p. 49-65 17 p.

**An oligomeric C-RING nacre protein influences pre-nucleation events and organizes mineral nanoparticles**

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**The intrinsically disordered C-RING biomineralization protein, AP7, creates protein phases that introduce nanopatterning and nanoporosities to mineral crystals**

Chang, E., Russ, J., Verch, A., Kröger, R., Estroff, L. & Evans, J., 15 Jul 2014, In: *Biochemistry*. 53, 27, p. 4317-4319 3 p.

**Ultrastructure and crystallography of nanoscale calcite building blocks in *Rhabdosphaera clavigera* coccolith spines**

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**In situ electron microscopy studies of calcium carbonate precipitation from aqueous solution with and without organic additives**

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**Preparation of hydrosol suspensions of elemental and core-shell nanoparticles by co-deposition with water vapour from the gas-phase in ultra-high vacuum conditions**

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**An artificial biomineral formed by incorporation of copolymer micelles in calcite crystals**

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**Polar and nonpolar HVPE GaN substrates: impact of doping on the structural, electrical and optical characteristics**

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**Defects and Interfaces in a-plane GaN on r-plane sapphire**

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**The role of anisotropy for defect properties in a-plane GaN**

Kröger, R. & Paskova, T., 21 Apr 2008, *Gallium Nitride Materials and Devices III*. Vol. 6894. 689403

**Structural investigation of growth and dissolution of In<sub>x</sub>Ga<sub>1-x</sub>N nano-islands grown by molecular beam epitaxy**

Pretorius, A., Yamaguchi, T., Kuebel, C., Kroeger, R., Hommel, D. & Rosenauer, A., 15 Feb 2008, In: *Journal of Crystal Growth*. 310, 4, p. 748-756 9 p.

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Pretorius, A., Mueller, K., Yamaguchi, T., Kroger, R., Hommel, D. & Rosenauer, A., 2008, *MICROSCOPY OF SEMICONDUCTING MATERIALS 2007*. Cullis, A. & Midgley, P. (eds.). BERLIN: Springer, p. 17-20 4 p. (Springer Proceedings in Physics; vol. 120).

**Defect and emission distributions in bulk GaN grown in polar and nonpolar directions: A comparative analysis**

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### **Interaction of Stacking Faults in Wurtzite a-Plane GaN on r-Plane Sapphire**

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### **The role of anisotropy for the defect properties in a-plane GaN - art. no. 689403**

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### **Defect distribution in a-plane GaN on Al<sub>2</sub>O<sub>3</sub>**

Tuomisto, F., Paskova, T., Kroger, R., Figge, S., Hommel, D., Monemar, B. & Kersting, R., 19 Mar 2007, In: *Applied Physics Letters*. 90, 12, 3 p., 121915.

### **Interfacial structure of a-plane GaN grown on r-plane sapphire**

Kroger, R., Paskova, T., Figge, S., Hommel, D., Rosenauer, A. & Monemar, B., Feb 2007, In: *Applied Physics Letters*. 90, 8, p. 081918

### **Defect structure of a-plane GaN grown by hydride and metal-organic vapor phase epitaxy on r-plane sapphire**

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Kroeger, R., Paskova, T., Figge, S., Hommel, D., Rosenauer, A. & Monemar, B., 2007, In: *Applied Physics Letters*. 90, 24

### **Nonpolar a- and m-plane bulk GaN sliced from boules: structural and optical characteristics**

Paskova, T., Kroeger, R., Hornmell, A., Paskov, P. P., Monemar, B., Preble, E., Hauser, A., Williams, N. M. & Tutor, M., 2007, *Physica Status Solidi C - Current Topics in Solid State Physics, Vol 4 No 7 2007*. Vol. 4. p. 2536-2539 4 p.

### **On the mechanism of dislocation and stacking fault formation in a-plane GaN films grown by hydride vapor phase epitaxy**

Kroeger, R., Paskova, T., Rosenauer, A., Hommel, D., Monemar, B., Fini, P., Haskell, B., Speck, J. & Nakamura, S., 2007, *Physics of Semiconductors, Pts A and B*. Jantsch, W. S. F. (ed.). Unknown Publisher, Vol. 893. p. 341-342 2 p. (Aip Conference Proceedings).

### **Spatially resolved characterization of plastic deformation induced by focused-ion beam processing in structured InGaN/GaN layers**

Barabash, R., Ice, G., Kroger, R., Lohmeyer, H., Sebald, K., Gutowski, J., Bottcher, T., Hommel, D., Liu, W. & Chung, J. S., 2007, *Ion-Beam-Based Nanofabrication*. Ila, D. B. J. K. N. C. P. K. (ed.). Vol. 1020. p. 21-27 7 p. (Materials Research Society Symposium Proceedings).

### **Electrical current-induced structural changes and chemical functionalization of carbon nanotubes**

Agrawal, S., Raghuvver, M. S., Kroger, R. & Ramanath, G., Nov 2006, In: *Journal of Applied Physics*. 100, 9, 094314.

### **Synthesis and Assembly of Monodisperse High-Coercivity Silica-Capped FePt Nanomagnets of Tunable Size, Composition, and Thermal Stability from Microemulsions**

Yan, Q., Purkayastha, A., Kim, T., Kroger, R., Bose, A. & Ramanath, G., Oct 2006, In: *Advanced Materials*. 18, 19, p. 2569-2573 5 p.

### **High-quality bulk a-plane GaN sliced from boules in comparison to heteroepitaxially grown thick films on r-plane sapphire**

Paskova, T., Kroger, R., Figge, S., Hommel, D., Darakchieva, V., Monemar, B., Preble, E. A., Hanser, A. D., Williams, N. M. & Tutor, M., 31 Jul 2006, In: *Applied Physics Letters*. 89, 5, 4 p., 051914.

### **Less strain energy despite fewer misfit dislocations: the impact of ordering**

Schmidt, T., Kroger, R., Flege, J. I., Clausen, T., Falta, J., Janzen, A., Zahl, P., Kury, P., Kammler, M. & Horn-von Hoegen, M., 13 Feb 2006, In: *Physical Review Letters*. 96, 6, p. 1-4 4 p., 066101.

#### **Confined optical modes in monolithic II-VI pillar microcavities**

Lohmeyer, H., Sebal, K., Kruse, C., Kroger, R., Gutowski, J., Hommel, D., Wiersig, J., Baer, N. & Jahnke, F., 30 Jan 2006, In: Applied Physics Letters. 88, 5, 4 p., 051101.

#### **Anisotropic spatial correlation of CdSe/Zn(S)Se quantum dot stacks grown by MBE**

Roventa, E., Alexe, G., Schowalter, M., Kroger, R., Hommel, D. & Rosenauer, A., 2006, *Physica Status Solidi C - Current Topics in Solid State Physics, Vol 3, No 4*. Stutzmann, M. (ed.). Vol. 3. p. 887-890 4 p. (Physica Status Solidi C-Current Topics in Solid State Physics).

#### **Anti-diffusion barriers for gold-based metallizations to p-GaN**

Piotrowska, A., Kaminska, E., Guziewicz, M., Dynowska, E., Stonert, A., Turos, A., Figge, S., Kroger, R. & Hommel, D., 2006, *GaN, AlN, InN and Related Materials*. Kuball, M. M. T. H. R. J. M. M. T. (ed.). Vol. 892. p. 351-356 6 p. (Materials Research Society Symposium Proceedings).

#### **Crack free monolithic nitride vertical-cavity surface-emitting laser structures and pillar microcavities**

Lohmeyer, H., Sebal, K., Kruse, C., Kroeger, R., Gutowski, J., Hommel, D., Wiersig, J. & Jahnke, F., 2006, In: *Physica status solidi a-Applications and materials science*. 203, 7, p. 1749-1753 5 p.

#### **Microscopic emission properties of nonpolar a-plane GaN grown by HVPE - art. no. 612106**

Paskova, T., Kroeger, R., Paskov, P. P., Figge, S., Hommel, D., Monemar, B., Haskell, B., Fini, P., Speck, J. S., Nakamura, S., Litton, C., Grote, J., Morkoc, H. & Madhukar, A., 2006, *Gallium Nitride Materials and Devices*. Vol. 6121. p. 12106 1 p.

#### **Relaxation in crack-free AlN/CrN superlattices**

Kroger, R., Kruse, C., Roder, C., Hommel, D. & Rosenauer, A., 2006, In: *Physica status solidi (b) Basic research*. 243, 7, p. 1533-1536 4 p.

#### **Structural analysis of pyramidal defects in Mg-doped GaN**

Pretorius, A., Schowalter, A., Daneu, N., Kroeger, R., Reclnik, A. & Rosenauer, A., 2006, *Physica Status Solidi C - Current Topics in Solid State Physics, Vol 3, No 6*. Hildebrandt, S. S. M. (ed.). Vol. 3. p. 1803-1806 4 p. (Physica Status Solidi C-Current Topics in Solid State Physics).

#### **Surface segregation of Si and Mg dopants in MOVPE grown GaN films revealed by X-ray photoemission spectroscopy**

Schmidt, T., Siebert, M., Flege, J. I., Gangopadhyay, S., Pretorius, A., Kroger, R., Figge, S., Gregoratti, L., Barinov, A., Hommel, D. & Falta, J., 2006, *Physica Status Solidi C - Current Topics in Solid State Physics, Vol 3, No 6*. Hildebrandt, S. S. M. (ed.). Vol. 3. p. 1725-1728 4 p. (Physica Status Solidi C-Current Topics in Solid State Physics).

#### **TEM analyses of wurtzite InGaN islands grown by MOVPE and MBE**

Pretorius, A., Yamaguchi, T., Kuebel, C., Kroeger, R., Hommel, D. & Rosenauer, A., 2006, *Physica Status Solidi C - Current Topics in Solid State Physics, Vol 3, No 6*. Hildebrandt, S. S. M. (ed.). Vol. 3. p. 1679-1682 4 p. (Physica Status Solidi C-Current Topics in Solid State Physics).

#### **The versatility of hot-filament activated chemical vapor deposition**

Schaefer, L., Hofer, M. & Kroeger, R., 2006, In: *THIN SOLID FILMS*. 515, 3, p. 1017-1024 8 p.

#### **On the microstructure of Al<sub>x</sub>Ga<sub>1-x</sub>N layers grown on 6H-SiC(0001) substrates**

Kröger, R., Einfeldt, S., Chierchia, R., Reitmeier, Z. J., Davis, R. F., Liu, Q. K. K. & Hommel, D., 31 Mar 2005, In: *Journal of Applied Physics*. 97, 8, p. Art. No. 083501

#### **Surfactant-mediated epitaxy of Ge on Si(111): Beyond the surface**

Schmidt, T., Kroger, R., Clausen, T., Falta, J., Janzen, A., Kammler, M., Kury, P., Zahl, P. & Horn-von Hoegen, M., 14 Mar 2005, In: *Applied Physics Letters*. 86, 11, 4 p., 111910.



#### **CdSe and InGaN quantum dots for short wavelength light emitters**

Hommel, D., Gust, A., Passow, T., Klude, A., Yamaguchi, T., Roventa, E., Pretorius, A., Kroeger, R., Sebald, K., Gutowski, J. & [No Value], I., 2005, Unknown Publisher. (Idw/Ad '05: Proceedings of the 12th International Display Workshops in Conjunction with Asia Display 2005, Vols 1 and 2)

#### **Characterization and structuring of nitride-based heterostructures for vertical-cavity surface-emitting lasers**

Kroeger, R., Kruse, C., Dennemarck, J., Hommel, D. & Rosenauer, A., 2005, *Microscopy of Semiconducting Materials*. Cullis, A. G. H. J. L. (ed.). Vol. 107. p. 79-82 4 p. (Springer Proceedings in Physics).

#### **Investigation of In<sub>x</sub>Ga<sub>1-x</sub>N islands with electron microscopy**

Pretorius, A., Yamaguchi, T., Schowalter, M., Kroeger, R., Kuebel, C., Hommel, D. & Rosenauer, A., 2005, *Microscopy of Semiconducting Materials*. Cullis, A. G. H. J. L. (ed.). Vol. 107. p. 17-20 4 p. (Springer Proceedings in Physics).

#### **Microstructure of highly p-type doped GaN sub-contact layers for low-resistivity contacts**

Kroger, R., Dennemarck, J., Bottcher, T., Figge, S. & Hommel, D., 2005, *GaN, AlN, InN and Their Alloys*. Wetzel, C. G. B. K. M. M. M. (ed.). Cambridge University Press, Vol. 831. p. 411-415 5 p. (Materials Research Society Symposium Proceedings).

#### **Optoelectronic devices on bulk GaN**

Figge, S., Bottcher, T., Dennemarck, J., Kroger, R., Paskova, T., Monemar, B. & Hommel, D., 2005, In: *Journal of Crystal Growth*. 281, 1, p. 101-106 6 p.

#### **Resonant modes in monolithic nitride pillar microcavities**

Lohmeyer, H., Sebald, K., Gutowski, J., Kroger, R., Kruse, C., Hommel, D., Wiersig, J. & Jahnke, F., 2005, In: *European physical journal b*. 48, 3, p. 291-294 4 p.

#### **Room-temperature operation of a green monolithic II-VI vertical-cavity surface-emitting laser**

Kruse, C., Sebald, K., Lohmeyer, H., Brendemuhl, B., Kroger, R., Gutowski, J. & Hommel, D., 2005, *Physics of Semiconductors, Pts A and B*. Menendez, J. V. C. G. (ed.). Vol. 772. p. 1521-1522 2 p. (Aip Conference Proceedings).

#### **Structural investigations of spatial correlation of CdSe/ZnSe quantum dot stacks grown by molecular beam epitaxy**

Roventa, E., Alexe, G., Kroger, R., Hommel, D. & Rosenauer, A., 2005, In: *Journal of Crystal Growth*. 278, 1-4, p. 316-319 4 p.

#### **ZnSe-based laser diodes: New approaches**

Gust, A., Kruse, C., Klude, M., Roventa, E., Kroger, R., Sebald, K., Lohmeyer, H., Brendemuhl, B., Gutowski, J. & Hommel, D., 2005, *E-MRS 2004 Fall Meeting Symposia C and F*. Stutzmann, M. (ed.). Vol. 2. p. 1098-1105 8 p. (Physica Status Solidi C-Current Topics in Solid State Physics).

#### **Defect characterization of electrically degraded ZnSe based laser diodes**

Kroger, R., Roventa, E., Gust, A., Ueta, A., Klude, M., Hummel, D. & Ryder, P., 2004, In: *Physica status solidi a-Applied research*. 201, 4, p. R28-R30

#### **Determination of the anisotropic optical properties for perfluorinated vanadyl phthalocyanine thin films**

Gordan, O. D., Friedrich, M., Michaelis, W., Kroger, R., Kampen, T., Schlettwein, D. & Zahn, D. R. T., 2004, In: *Journal of Materials Research*. 19, 7, p. 2008-2013 6 p.

#### **Green monolithic II-VI vertical-cavity surface-emitting laser operating at room temperature**

Kruse, C., Ulrich, S. M., Alexe, G., Roventa, E., Kroger, R., Brendemuhl, B., Michler, P., Gutowski, J. & Hommel, D., 2004, In: *Physica status solidi (b)*. 241, 3, p. 731-738 8 p.

#### **Microstructural study of quantum well degradation in ZnSe-based laser diodes**

Roventa, E., Kroger, R., Klude, M., Ueta, A., Alexe, G., Ryder, P. & Hommel, D., 2004, Wiley-Blackwell. (11th International Conference on II-VI Compounds)

**The role of sub-contact layers in the optimization of low-resistivity contacts to p-type GaN**

Dennemarck, J., Bottcher, T., Figge, S., Einfeldt, S., Kroger, R., Hommel, D., Kaminska, E., Wiatroszak, W. & Piotrowska, A., 2004, Wiley-Blackwell. (5th International Symposium on Blue Laser and Light Emitting Diodes, Proceedings)

**Compositional fluctuations in  $\text{Al}_x\text{Ga}_{1-x}\text{N}$  layers grown on 6H-SiC (0001) by metal organic vapor phase epitaxy**

Kroger, R., Einfeldt, S., Reitmeier, Z. J., Chierchia, R., Ryder, P., Hommel, D. & Davis, R. F., 2003, *Gan and Related Alloys-2002*. Wetzel, C. Y. E. T. S. J. S. A. Y. (ed.). Vol. 743. p. 255-260 6 p. (Materials Research Society Symposium Proceedings).

**TEM investigation of defect reduction and etch pit formation in GaN**

Vennemann, A., Dennemarck, J., Kroger, R., Bottcher, T., Hommel, D. & Ryder, P., 2003, *Gan and Related Alloys - 2003*. Ng, H. M. W. M. H. K. G. N. (ed.). Vol. 798. p. 759-764 6 p. (Materials Research Society Symposium Proceedings).

**The role of the growth temperature for the SiN interlayer deposition in GaN**

Bottcher, T., Dennemarck, J., Kroger, R., Figge, S. & Hommel, D., 2003, *5th International Conference on Nitride Semiconductors*. Stutzmann, M. (ed.). p. 2039-2042 4 p. (Physica Status Solidi C-Current Topics in Solid State Physics).

**Plasma induced microstructural, compositional, and resistivity changes in ultrathin chemical vapor deposited titanium nitride films**

Kröger, R., Eizenberg, M., Marcadal, C. & Chen, L., Apr 2002, In: *Journal of Applied Physics*. 91, 8, p. 5149-5154 5 p.

**Investigation of green emitting monolithic II-VI vertical cavity surface emitting laser**

Kruse, C., Alexe, G., Kroger, R., Klude, M., Heinke, H., Hommel, D., Ulrich, S., Michler, P. & Gutowski, J., 2002, *Materials and Devices for Optoelectronics and Microphotonics*. Wehrspohn, R. B. M. R. N. S. S. C. (ed.). Vol. 722. p. 141-146 6 p. (Materials Research Society Symposium Proceedings).

**Magnesium segregation and the formation of pyramidal defects in p-GaN**

Figge, S., Kroger, R., Bottcher, T., Ryder, P. L. & Hommel, D., 2002, In: *Applied Physics Letters*. 81, 25, p. 4748-4750 3 p.

**Mg related defect formation during MOVPE growth of GaN based films studied by transmission electron microscopy**

Kroger, R., Figge, S., Bottcher, T., Ryder, P. L. & Hommel, D., 2002, *Gan and Related Alloys-2001*. Northrup, J. E. N. J. L. D. C. C. S. F. R. H. (ed.). Vol. 693. p. 615-619 5 p. (Materials Research Society Symposium Proceedings).

**On the way to the II-VI quantum dot VCSEL**

Passow, T., Klude, M., Kruse, C., Leonardi, K., Kroger, R., Alexe, G., Sebald, K., Ulrich, S., Michler, P., Gutowski, J., Heinke, H. & Hommel, D., 2002, *Advances in Solid State Physics 42*. Kramer, B. (ed.). Vol. 42. p. 13-25 13 p. (Advances in Solid State Physics).

**Optical gain of CdSe quantum dot stacks**

Sebald, K., Michler, P., Gutowski, J., Kroger, R., Passow, T., Klude, M. & Hommel, D., 2002, In: *Physica status solidi a-Applied research*. 190, 2, p. 593-597 5 p.

**Pyramidal defect formation in view of magnesium segregation**

Figge, S., Kroger, R., Bottcher, T., Ryder, P. & Hommel, D., 2002, In: *Physica status solidi a-Applied research*. 192, 2, p. 456-460 5 p.

**Realization of a GaN laser diode with wet etched facets**

Bottcher, T., Zellweger, C., Figge, S., Kroger, R., Petter, C., Buhlmann, H. J., Ilegems, M., Ryder, P. L. & Hommel, D., 2002, In: *Physica status solidi a-Applied research*. 191, 1, p. R3-R5

**Electrically pumped lasing from CdSe quantum dots**

Klude, M., Passow, T., Kroger, R. & Hommel, D., 2001, In: *Electronics Letters*. 37, 18, p. 1119-1120 2 p.

#### **Influence of diffusion barriers on the nucleation and growth of CVD Cu for interconnect applications**

Kroger, R., Eizenberg, M., Cong, D., Yoshida, N., Chen, L. Y., Ramaswami, S. & Carl, D., 2000, In: *Microelectronic Engineering*. 50, 1-4, p. 375-381 7 p.

#### **The role of kinetics in the nucleation and void formation in copper films produced by chemical vapor deposition**

Kroger, R., Eizenberg, M., Rabkin, E., Cong, D. & Chen, L., 2000, In: *Journal of Applied Physics*. 88, 4, p. 1867-1872 6 p.

#### **Nucleation and growth of CVD Cu films**

Kroger, R., Eizenberg, M., Cong, D., Yoshida, N., Chen, L. Y. & Chen, L., 1999, *Advanced Interconnects and Contacts*. Edelstein, D. C. K. T. O. M. C. T. K. N. W. E. J. (ed.). Vol. 564. p. 237-241 5 p. (Materials Research Society Symposium Proceedings).

#### **Properties of copper films prepared by chemical vapor deposition for advanced metallization of microelectronic devices**

Kroger, R., Eizenberg, M., Cong, D., Yoshida, N., Chen, L. Y., Ramaswami, S. & Carl, D., 1999, In: *Journal of the Electrochemical Society*. 146, 9, p. 3248-3254 7 p.

#### **Enhanced diamond film growth by hot-filament CVD using forced convection**

Kroger, R., Schafer, L., Klages, C. P. & Six, R., 1996, In: *Physica status solidi a-Applied research*. 154, 1, p. 33-42 10 p.

#### **MASS AND OPTICAL-EMISSION SPECTROSCOPY OF PLASMAS FOR DIAMOND-SYNTHESIS**

Benndorf, C., Joeris, P. & Kroger, R., 1994, In: *PURE AND APPLIED CHEMISTRY*. 66, 6, p. 1195-1205 11 p.

#### **INVESTIGATIONS CONCERNING THE ROLE OF HYDROGEN IN THE DEPOSITION OF DIAMOND FILMS**

Joeris, P., Benndorf, C. & Kroger, R., 1993, In: *Surface & coatings technology*. 59, 1-3, p. 310-315 6 p.

## **Activities**

#### **Frontiers of Physical Imaging - Royal Microscopical Society**

Kroeger, R. (Chair)

19 Nov 2024 → 20 Nov 2024

#### **Nanoscale organization of bone**

Kroger, R. (Invited speaker)

25 May 2024

#### **Unraveling the nanoscale organisation of marine calcifiers using advanced microscopy and spectroscopy**

Kroger, R. (Invited speaker)

22 May 2024

#### **Studying collagen mineralization dynamics using in-situ Raman spectroscopy together with in-situ small and wide-angle X-ray scattering**

Kroeger, R. (Speaker)

23 Oct 2023 → 25 Oct 2023

#### **33rd Annual Conference of the European Society for Biomaterials**

Kroger, R. (Keynote/plenary speaker)

4 Sept 2023

#### **McGill Summer School 2023 - Electron Microscopy Techniques**

Kroger, R. (Invited speaker)

5 Jun 2023 → 7 Jun 2023

**Application of microscopy and spectroscopy for the interrogation of biominerals**

Kroger, R. (Invited speaker)  
21 Mar 2023

**Ultrastructure and Composition of the Abdominal Wall**

Kröger, R. (Keynote/plenary speaker)  
1 Feb 2023 → 3 Feb 2023

**Investigating the structure and formation dynamics of biomineralising systems**

Kröger, R. (Invited speaker)  
15 Dec 2022

**Revealing the 3D structure and formation dynamics of biominerals using electrons, X-rays and photons**

Kröger, R. (Invited speaker)  
22 Jul 2022

**University of Connecticut School of Medicine**

Kröger, R. (Advisor)  
27 Jun 2022 → 31 Jul 2027

**Transmission Electron Microscopy using Liquid Cells**

Kröger, R. (Invited speaker)  
21 Jun 2022

**Advanced electron microscopy and X-ray scattering techniques to study bone mineralisation**

Kröger, R. (Invited speaker)  
1 May 2022

**McGill University**

Kröger, R. (Advisor)  
25 Apr 2022 → 27 Jul 2022

**3D imaging and in situ studies of hierarchical biominerals**

Kroger, R. (Keynote/plenary speaker)  
26 Aug 2021

**3D Analysis of the Bone Nanostructure**

Kroger, R. (Invited speaker)  
2021 → ...

**Science Foundation of Ireland (SFI)**

Kroger, R. (Reviewer)  
2021

**The Small Scale Matters: Using Electron Microscopy to Interrogate Biogenic Materials**

Kroger, R. (Invited speaker)  
6 Nov 2020

**Nature (Journal)**

Kroger, R. (Reviewer)  
20 Jun 2020

**ACS Nano (Journal)**

Kroger, R. (Reviewer)  
Jun 2020

**ADVANCED FUNCTIONAL MATERIALS (Journal)**

Kroger, R. (Reviewer)

2020 → ...

**Royal Microscopical Society (External organisation)**

Kroger, R. (Advisor)

2020 → ...

**Sloan Foundation**

Kroger, R. (Advisor)

2020

**Understanding and Mimicking Biomineralisation**

Kroger, R. (Invited speaker)

2020

**International Conferences on the Chemistry and Biology of Mineralized Tissues**

Kroger, R. (Member of programme committee)

20 Oct 2019 → ...

**Microscience Microscopy 2019**

Kröger, R. (Organiser)

1 Jul 2019 → 4 Jul 2019

**The 53rd Annual Meeting of the Israel Society for Microscopy**

Kroger, R. (Invited speaker)

29 May 2019

**Acta Biomaterialia (Journal)**

Kroger, R. (Reviewer)

2019 → ...

**Nature (Journal)**

Kroger, R. (Reviewer)

2019

**Proceedings of the National Academy of Sciences of the United States of America (Journal)**

Kroger, R. (Guest editor)

2019 → ...

**On fractures, fractions and fractals: Insights into bone and collagen/apatite composites**

Kroger, R. (Invited speaker)

14 Nov 2018

**BPSI Summer Symposium 2018: Business as Usual? – Collaborative Research at the University-Business Interface**

Kroger, R. (Organiser)

28 Jun 2018

**Microscopy characterisation of organic-inorganic Interfaces**

Kröger, R. (Invited speaker)

22 Feb 2018

**Angewandte Chemie International Edition (Journal)**

Kroger, R. (Reviewer)  
2018

**CRYSTAL GROWTH DESIGN (Journal)**

Kroger, R. (Reviewer)  
2018 → ...

**Crystals (Journal)**

Kröger, R. (Reviewer)  
2018

**CrystEngComm (Journal)**

Kroger, R. (Reviewer)  
2018 → ...

**In situ microscopy workshop at CIC/Nanogune San Sebastian**

Kroger, R. (Invited speaker)  
2018 → ...

**Journal of the Royal Society Interface (Journal)**

Kroger, R. (Reviewer)  
2018 → ...

**Nano Letters (Journal)**

Kroger, R. (Reviewer)  
2018 → ...

**Nature Communications (Journal)**

Kroger, R. (Reviewer)  
2018

**Nature Materials (Journal)**

Kroger, R. (Reviewer)  
2018 → ...

**PLoS ONE (Journal)**

Kröger, R. (Reviewer)  
2018

**Proceedings of the National Academy of Sciences of the United States of America (Journal)**

Kroger, R. (Reviewer)  
2018 → ...

**Royal Microscopical Society (External organisation)**

Kroger, R. (Trustee)  
2018 → ...

**Scientific Reports (Journal)**

Kroger, R. (Reviewer)  
2018

**Microscopy and Microspectroscopy of Nanomaterials in Liquids**

Kroger, R. (Organiser)  
18 Sept 2017

**Specialized iNANO Lecture: Quantitative Investigation of Nanomaterials using Advanced Transmission Electron Microscopy**

Kroger, R. (Invited speaker)  
9 Aug 2017

**Laurie Gower**

Kroger, R. (Host)  
15 Jun 2017 → 15 Jul 2017

**International Conference on the Chemistry and Biology of Mineralized Tissue**

Kroger, R. (Invited speaker)  
29 May 2017 → 1 Jun 2017

**12th Pacific Rim Conference on Ceramic and Glass Technology - Hawaii, US**

Kroger, R. (Invited speaker)  
21 May 2017 → 26 May 2017

**Studying oxidation pathways and structure of Fe-based NPs with high-resolution TEM**

Kroger, R. (Invited speaker)  
19 Jan 2017

**Acta Biomaterialia (Journal)**

Kröger, R. (Reviewer)  
2017

**Chemistry of Materials (Journal)**

Kröger, R. (Reviewer)  
2017

**CrystEngComm (Journal)**

Kröger, R. (Reviewer)  
2017 → ...

**Journal of biomechanics (Journal)**

Kroger, R. (Reviewer)  
2017

**McGill University: Anatomy and Cell Biology Departmental Seminar**

Kröger, R. (Invited speaker)  
2017

**MMC17 -EMAG17 Manchester**

Kröger, R. (Participant)  
2017

**Nature Communications (Journal)**

Kroger, R. (Reviewer)  
2017

**Proceedings of the National Academy of Sciences of the United States of America (Journal)**

Kroger, R. (Reviewer)  
2017

**Nanomaterials in Action**

Kroger, R. (Invited speaker)  
6 Oct 2016

**In situ studies of biological and bio-inspired materials using electron microscopy in liquids - Presentation at the University of Münster/Germany**

Kroger, R. (Invited speaker)  
5 Sept 2016

**Material Research Society Spring Meeting in Phoenix/Arizona**

Kroger, R. (Invited speaker)  
28 Mar 2016 → 1 Apr 2016

**Israel Society of Microscopy Golden Jubilee Conference**

Kroger, R. (Invited speaker)  
2016 → ...

**PhD Examination**

Kroger, R. (Examiner (external))  
2016

**Scientific Reports (Journal)**

Kroger, R. (Reviewer)  
2016 → ...

**The International Chemical Congress of the Pacific Basin Societies**

Kroger, R. (Invited speaker)  
15 Dec 2015 → 20 Dec 2015

**The International Chemical Congress of the Pacific Basin Societies**

Kroger, R. (Invited speaker)  
15 Dec 2015 → 20 Dec 2015

**ACCGE 20 (American Conference on Crystal Growth and Epitaxy) in Big Sky/Montana**

Kroger, R. (Chair)  
3 Aug 2015 → 7 Aug 2015

**American Conference on Crystal Growth and Epitaxy (ACCGE-20)**

Kroger, R. (Invited speaker)  
3 Aug 2015 → 7 Aug 2015

**International Workshop of the ARISTEIA Project COMANA Complex Magnetic Nanostructures**

Kroger, R. (Invited speaker)  
2 Jun 2015 → 5 Jun 2015

**Analytical Chemistry (Journal)**

Kroger, R. (Reviewer)  
Mar 2015 → ...

**ADVANCED FUNCTIONAL MATERIALS (Journal)**

Kroger, R. (Reviewer)  
1 Jan 2015 → ...



**Royal Microscopy Society (External organisation)**

Kroger, R. (Member)

1 Jan 2015 → ...

**ACS Nano (Journal)**

Kroger, R. (Reviewer)

2015 → ...

**Advanced Materials (Journal)**

Kroger, R. (Reviewer)

2015

**ROYAL MICROSCOPICAL SOCIETY (External organisation)**

Kroger, R. (Member)

2015 → ...

**Nanomaterials Research using Electron Microscopy - University of Florida**

Kroger, R. (Invited speaker)

9 Dec 2014

**Materials Research Society Fall Meeting 2014**

Kroger, R. (Organiser)

1 Dec 2014 → 5 Dec 2014

**Microscience Microscopy Congress 2014**

Kroger, R. (Organiser)

1 Jul 2014 → 3 Jul 2014

**New approaches for the nanoscale study of processes in liquids by electron microscopy - MMC2014**

Kroger, R. (Invited speaker)

1 Jul 2014 → 3 Jul 2014

**E-MRS Spring Meeting 2014**

Kroger, R. (Invited speaker)

26 May 2014 → 30 May 2014

**Langmuir (Journal)**

Kroger, R. (Reviewer)

2014 → ...

**Nature Communications (Journal)**

Kroger, R. (Reviewer)

2014 → ...

**Electron Microscopy and Analysis Group (EMAG) Conference**

Kroger, R. (Invited speaker)

3 Sept 2013 → 6 Sept 2013

**Electron Microscopy and Analysis Group (EMAG) Conference**

Kroger, R. (Invited speaker)

3 Sept 2013 → 6 Sept 2013

**Weizmann Institute of Science, Department of Structural Biology**

Kroger, R. (Researcher)  
5 Aug 2013 → 25 Aug 2013

**Leeds EPSRC Nanoscience and Nanotechnology Facility (LENNF) re-launch event**

Kroger, R. (Invited speaker)  
25 Jun 2013

**Studying mineral/organic composites with electron microscopy - Materials Science at the Physics/Biology interface**

Kroger, R. (Invited speaker)  
25 Jun 2013

**Earth & Environmental Sciences Seminar - University of St. Andrews**

Kroger, R. (Invited speaker)  
23 Apr 2013

**Journal of Crystal Growth (Journal)**

Kroger, R. (Reviewer)  
2013

**Journal of Nanoparticle Research (Journal)**

Kroger, R. (Reviewer)  
2013 → ...

**JOURNAL OF STRUCTURAL BIOLOGY (Journal)**

Kroger, R. (Reviewer)  
2013 → ...

**Nanotechnology (Journal)**

Kroger, R. (Reviewer)  
2013

**London Centre for Nanotechnology Seminar - Imperial College**

Kroger, R. (Invited speaker)  
6 Dec 2012

**The 15th European Microscopy Congress**

Kroger, R. (Organiser)  
16 Sept 2012 → 21 Sept 2012

**Microscopy and Microanalysis**

Kroger, R. (Invited speaker)  
29 Jul 2012 → 2 Aug 2012

**Studying carbonate precipitation in-situ using electron microscopy**

Kroger, R. (Invited speaker)  
29 Jul 2012 → 2 Aug 2012

**CECAM Workshop: Structure-Property Relationships in Hierarchical Biocomposites in Lausanne/Switzerland**

Kroger, R. (Organiser)  
16 Jul 2012 → 18 Jul 2012

**CECAM workshop: Grand Challenges in Understanding Interfaces Between Hard and Soft Matter**

Kroger, R. (Invited speaker)  
11 May 2011 → 14 May 2011

## **JOURNAL OF STRUCTURAL BIOLOGY (Journal)**

Kroger, R. (Reviewer)

2011 → ...

## **Structural characterization of the mineral phase and organic/mineral interfaces in the coral skeleton**

Kroger, R. (Invited speaker)

29 Nov 2010 → 2 Dec 2010

## **Symposium NN: Biomineralization and Bioinspired Inorganic and Inorganic/Organic Materials - Materials Research Society Fall Meeting**

Kroger, R. (Invited speaker)

29 Nov 2010 → 2 Dec 2010

## **Micron (Journal)**

Kroger, R. (Reviewer)

2010 → ...

## **Symposium on Advanced Oxide Materials: 2nd UK-Taiwan International Networking for Young Scientists**

Kroger, R. (Invited speaker)

9 Mar 2009 → 12 Mar 2009

## **University of Illinois at Urbana-Champaign**

Kroger, R. (Visitor)

Aug 2007 → Jul 2008

## **Awards**

### **Revealing the 3D nanoscale structure and composition of healthy and diseased bone and teeth**

Kroger, R. (Principal investigator)

EPSRC: £42,298.40

1/04/22 → 31/07/22

## **Projects**

### **Aberration-Corrected Scanning Transmission Electron Microscope with atomic resolution spectroscopy under controlled environmental conditions: AC-eSTEM**

Lazarov, V. (Principal investigator), Boyes, E. D. (Co-investigator), Gai, P. L. (Co-investigator), Kroger, R. (Co-investigator), Tear, S. (Co-investigator) & Yuan, J. (Co-investigator)

EPSRC

1/11/19 → 30/04/26

### **MIB - Materials in Biology: Hard-Soft Matter Interfaces: From Understanding to Engineering**

Kroger, R. (Principal investigator)

EPSRC

1/09/10 → 3/03/16

### **Mimicking and quantifying bone growth using X-ray spectroscopy and electron microscopy**

Kroger, R. (Principal investigator) & Parker, J. (Principal investigator)

1/01/18 → 30/06/21

### **Nanoparticle interaction with proteins**

Kroger, R. (Principal investigator)

1/01/18 → 30/06/24

**Revealing the 3D nanoscale structure and composition of healthy and diseased bone and teeth**

Kroger, R. (Principal investigator)

EPSRC

1/04/22 → 31/07/22

**SMILEY: SMILEY: Smart Nano-structured Devices Hierarchically Assembled by Bio-mineralization Processes**

Kroger, R. (Principal investigator)

EUROPEAN COMMISSION

1/12/12 → 30/11/15

**The Control of Coral Biomineralisation**

Kroger, R. (Principal investigator) & Penkman, K. E. H. (Co-investigator)

LEVERHULME TRUST

9/04/16 → 1/11/19

**Understanding trace element and isotope partitioning in aragonites and calcites in biological environments**

Penkman, K. E. H. (Principal investigator) & Kroger, R. (Co-investigator)

NATURAL ENVIRONMENT RESEARCH COUNCIL

18/03/19 → 18/09/23

**URP 2019-20 (Strategic Capital) SEM-EDX: New Frontiers in Environmental and Heritage Science at York**

Little, A. P. (Principal investigator), Kroger, R. (Co-investigator), White, M. J. (Co-investigator), Brown, S. E. (Co-investigator), Craig, O. E. (Co-investigator), O'Higgins, P. (Co-investigator), Penkman, K. E. H. (Co-investigator), Hodson, M. E. (Co-investigator) & Gehrels, W. R. (Co-investigator)

1/08/19 → 31/07/20

**Wisdom Teeth: refining our understanding of human evolution through dating dental enamel**

Penkman, K. E. H. (Principal investigator) & Kroger, R. (Co-investigator)

NATURAL ENVIRONMENT RESEARCH COUNCIL

1/08/19 → 31/12/23

**OA: WUN-Ocean Acidification**

Kroger, R. (Principal investigator)

6/02/14 → ...