

dr. Romana Schirhagl  
Assistant Professor  
Department of Biomedical Engineering: General  
E-mail: r.schirhagl@umcg.nl  
Direct phone: +31 627105324



## Research interests

Diamond, Bioanalysis, Magnetometry, Metabolism, Cells, Molecular Imprinting, Imaging

## Working experience

from 2014 University of Groningen University Medical Center Groningen Department of Biomedical Engineering as Tenure Track Assistant Professor leading the Bioimaging and Bioanalysis group  
2011-2013 Postdoc at ETH-Zurich, Physics Department, Degen group  
2010-2011 Postdoc at Stanford University, Chemistry Department, Zare group  
2009-2010 Postdoc at Vienna University, Analytical Chemistry Department, Dickert group  
2007-2009 PhD student at Vienna University, Analytical Chemistry Department, Dickert group

## Education

2007-2009 Bachelor study in Biology at Vienna University (2nd degree not finished)  
2003-2007 Diploma study in Chemistry (equivalent to a Bachelor+Masters finished one year below official minimal time) at Vienna University,  
1995-2003 Grammar school (Bundesrealgymnasium Steyr)

## Activities

### 47th Annual International Conference of the IEEE

Schirhagl, R. (Speaker)  
14-Jul-2025 → 17-Jul-2025

### Gordon research conference

Schirhagl, R. (Speaker)  
26-Apr-2025 → 2-May-2025

### SPIE 25 Photonics West

Schirhagl, R. (Speaker)  
25-Jan-2025 → 30-Jan-2025

### 2024 MRS Fall Meeting & Exhibit

Schirhagl, R. (Speaker)  
1-Dec-2024 → 6-Dec-2024

### 3rd International Conference On Trends and Research in Chemistry - Hybrid (TRIC-2024)

Schirhagl, R. (Keynote speaker)  
6-Nov-2024 → 7-Nov-2024

### International Conference on Diamond and Carbon Materials 2024

Schirhagl, R. (Speaker)  
1-Sept-2024 → 5-Sept-2024

### FoQuS conference

Schirhagl, R. (Speaker)  
2-May-2024 → 3-May-2024

**Annual event of Women in Quantum Development**

Schirhagl, R. (Speaker)  
23-Apr-2024

**Colloquium FAU Erlangen**

Schirhagl, R. (Speaker)  
16-Jan-2024

**Colloquium Torino**

Schirhagl, R. (Speaker)  
1-Jan-2024

**Colloquium TU Munich**

Schirhagl, R. (Speaker)  
1-Jan-2024

**European Material Research Society (E-MRS), Warsaw, Poland**

Schirhagl, R. (Invited speaker)  
18-Sept-2023 → 21-Sept-2023

**The 2023 Fall Meeting of the European Materials Research Society (E-MRS)**

Schirhagl, R. (Attendee)  
18-Sept-2023 → 21-Sept-2023

**The Chinese Physical Society Fall Meeting**

Schirhagl, R. (Speaker)  
18-Aug-2023 → 20-Aug-2023

**2nd International Conference Trends and Research in Chemistry TRIC-2023-Hybrid**

Schirhagl, R. (Keynote speaker)  
16-May-2023 → 18-May-2023

**Emerging Methodologies to Investigate Quantum Effects in Biology**

Schirhagl, R. (Speaker)  
19-Mar-2023 → 24-Mar-2023

**Gordon Research Conference on Quantum Biology, Houston, USA**

Schirhagl, R. (Invited speaker)  
Mar-2023

**IQST Day**

Schirhagl, R. (Keynote speaker)  
16-Feb-2023

**NIH Virtual Workshop 2023**

Schirhagl, R. (Speaker)  
5-Jan-2023

**Adamas lecture series Raleigh**

Schirhagl, R. (Speaker)  
1-Jan-2023

**Colloquium Leipzig university**

Schirhagl, R. (Speaker)

2023

**Quantum Innovation 2022, Tokyo, Japan (online)**

Schirhagl, R. (Invited speaker)

Nov-2022

**Defects in Solids for Quantum Technologies (DSQT2022), Stockholm, Sweden**

Schirhagl, R. (Invited speaker)

Jun-2022

**IST Austria Institute Colloquium, Vienna, Austria**

Schirhagl, R. (Invited speaker)

Mar-2022

**33rd International Conference on Diamond and Carbon Materials (Event)**

Schirhagl, R. (Member)

2022 → ...

**Carl Zeiss Stiftung (External organisation)**

Schirhagl, R. (Reviewer)

2022

**CLEO/Europe-EQEC conference 2023 (Event)**

Schirhagl, R. (Member)

2022

**Czech Science Foundation (External organisation)**

Schirhagl, R. (Reviewer)

2022

**European Innovation Council and SMEs Executive Agency (EISMEA) of the European Commission (External organisation)**

Schirhagl, R. (Reviewer)

2022

**French funding organization inserm (External organisation)**

Schirhagl, R. (Reviewer)

2022

**Friedrich Maximilian University Erlangen (External organisation)**

Schirhagl, R. (Reviewer)

2022

**Institute Seminar, Stuttgart University, Stuttgart, Germany**

Schirhagl, R. (Invited speaker)

2022

**Quantum biology seminar series, UCLA, Los Angeles, USA (online)**

Schirhagl, R. (Invited speaker)

2022

**Termis conference, Krakow, Poland**

Schirhagl, R. (Invited speaker)

2022

**University of Melbourne (External organisation)**

Schirhagl, R. (Advisor)

2022

**Optics and Lasers 2021, Kyoto, Japan (online)**

Schirhagl, R. (Invited speaker)

28-Jun-2021

**2nd International conference on Pharma Industry & pharmaceuticals**

Schirhagl, R. (Keynote speaker)

27-Mar-2021

**Colloquium at Technische Universität Kaiserslautern, Kaiserslautern, Germany**

Schirhagl, R. (Invited speaker)

2021

**COMSATS University (External organisation)**

Schirhagl, R. (Reviewer)

2021

**German Research Foundation (External organisation)**

Schirhagl, R. (Member of board)

2021

**Hasselt University (External organisation)**

Schirhagl, R. (Advisor)

2021

**MRS fall meeting, Boston, USA**

Schirhagl, R. (Invited speaker)

2021

**NWO (External organisation)**

Schirhagl, R. (Member of board)

2021 → ...

**NWO (External organisation)**

Schirhagl, R. (Reviewer)

2021

**QUANTUM Seminar Wintersemester 2021/22, Johannes Gutenberg University, Mainz, Germany**

Schirhagl, R. (Invited speaker)

2021 → 2022

**Silesian University of Technology (External organisation)**

Schirhagl, R. (Advisor)

2021

**Sir Henry (Publisher)**

Schirhagl, R. (Peer reviewer)

2021

**Biointerfaces 2020 conference, Zurich, Switzerland (online)**  
Schirhagl, R. (Invited speaker)  
Aug-2020

**External Reviewer**  
Schirhagl, R. (Consultant)  
2020 → ...

**External reviewer for PhD thesis**  
Schirhagl, R. (Member of Assessment Committee)  
2020 → ...

**External reviewer for PhD thesis**  
Schirhagl, R. (Examiner)  
2020 → ...

**Israeli Ministry of Science and Technology for the call "Indian-Israeli joint research cooperation" (External organisation)**  
Schirhagl, R. (Reviewer)  
2020

**Periyar University India (External organisation)**  
Schirhagl, R. (Reviewer)  
2020

**Sonderforschungsbereich (SFB) (External organisation)**  
Schirhagl, R. (Member)  
2020 → 2021

**Sonderforschungsbereich (SFB) (External organisation)**  
Schirhagl, R. (Member)  
2020 → 2021

**University of Melbourne (External organisation)**  
Schirhagl, R. (Reviewer)  
2020

**Diamond magnetometry in a cell**  
Schirhagl, R. (Speaker)  
16-Sept-2019 → 19-Sept-2019

**PhD Day 2019**  
Schirhagl, R. (Invited speaker)  
20-Jul-2019

**Diamond and Single Photon Emitters**  
Schirhagl, R. (Speaker)  
23-Jun-2019 → 28-Jun-2019

**Imaging with Nanodiamond Probes**  
Schirhagl, R. (Keynote speaker)  
19-Jun-2019 → 21-Jun-2019

**UMCG bouwt brug**

Schirhagl, R. (Speaker)  
19-May-2019

**WE-Heraeus Seminar**

Schirhagl, R. (Speaker)  
25-Mar-2019 → 28-Mar-2019

**External adviser for PhD thesis**

Schirhagl, R. (Consultant)  
1-Jan-2019 → 31-Dec-2019

**External adviser for tenure track evaluations**

Schirhagl, R. (Consultant)  
1-Jan-2019 → 31-Dec-2019

**Frontiers in Physics (Journal)**

Schirhagl, R. (Editorial board member)  
1-Jan-2019 → 31-Dec-2019

**Nanomaterials (Basel, Switzerland) (Journal)**

Schirhagl, R. (Editorial board member)  
1-Jan-2019 → 31-Dec-2019

**NWO grants ENW KLEIN (External organisation)**

Schirhagl, R. (Member)  
1-Jan-2019 → 31-Dec-2019

**Proposal reviewer**

Schirhagl, R. (Consultant)  
1-Jan-2019 → 31-Dec-2019

**Proposal reviewer**

Schirhagl, R. (Consultant)  
1-Jan-2019 → 31-Dec-2019

**Proposal reviewer**

Schirhagl, R. (Consultant)  
1-Jan-2019 → 31-Dec-2019

**Proposal reviewing for GSMs PhD call**

Schirhagl, R. (Consultant)  
1-Jan-2019 → 31-Dec-2019

**Reviewer**

Schirhagl, R. (Consultant)  
1-Jan-2019 → 31-Dec-2019

**ZonMW grants for the call Enabling Technologies Hotels (External organisation)**

Schirhagl, R. (Member)  
1-Jan-2019 → 31-Dec-2019

**Rosalind Franklin Univ Med & Sci (External organisation)**

Schirhagl, R. (Member)  
2019 → ...

**W.J. Kolff Institute for Biomedical Engineering and Materials Science (KOLFF) (Organisational unit)**

Schirhagl, R. (Member)

2019 → ...

**Micro ESR: On chip magnetic resonance spectroscopy of microliter samples**

Schirhagl, R. (Keynote speaker)

14-Aug-2018

**DFG proposal reviewer**

Schirhagl, R. (Consultant)

1-Jan-2018 → 31-Dec-2018

**Dutch FOM (Dutch Physics Association) Projectruimte Grants (External organisation)**

Schirhagl, R. (Member)

1-Jan-2018 → 31-Dec-2018

**Award committee International Conference on Diamond and Carbon Materials Series (External organisation)**

Schirhagl, R. (Member)

2018

**Charles University**

Schirhagl, R. (Visiting researcher)

2018

**Department of Chemistry, Stanford University, Stanford, California, USA**

Schirhagl, R. (Visiting researcher)

2018

**Empa, Swiss Federal Laboratories for Materials Science & Technology (EMPA), Swiss Fed Labs Mat Sci & Technol, Lab Protect & Physiol**

Schirhagl, R. (Visiting researcher)

2018

**External adviser for PhD thesis Charles University in Prague**

Schirhagl, R. (Advisor)

2018

**Max Planck Society, Frankfurt, Germany**

Schirhagl, R. (Visiting researcher)

2018 → ...

**Proposal reviewer for German grant institution DFG**

Schirhagl, R. (Advisor)

2018

**Technical University of Munich (TUM)**

Schirhagl, R. (Visiting researcher)

2018

**University of California, Santa Barbara**

Schirhagl, R. (Visiting researcher)

2018

**External reviewer**

Schirhagl, R. (Consultant)  
1-Jan-2017 → 31-Dec-2017

**External reviewer for the Czech Science Foundation (GACR).**

Schirhagl, R. (Advisor)  
2017 → 2018

**Hasselt Diamond Workshop (External organisation)**

Schirhagl, R. (Member)  
2017 → ...

**Hasselt Diamond Workshop (External organisation)**

Schirhagl, R. (Member)  
2017 → ...

**External adviser**

Schirhagl, R. (Consultant)  
1-Jan-2016 → 31-Dec-2016

**Chemical Society Reviews (Journal)**

Schirhagl, R. (Editorial board member)  
1-Jan-2015 → 31-Dec-2015

**European Physical Society (EPS) (External organisation)**

Schirhagl, R. (Member)  
2015 → ...

**Progress Physics Projectruimte (formerly FOM Projectruimte), NWO (External organisation)**

Schirhagl, R. (Member)  
2015 → 2018

**American Chemical Society (External organisation)**

Schirhagl, R. (Member)  
2014 → ...

**Deutsche Bunsen-Gesellschaft für physikalische Chemie e. V. (DBG) (External organisation)**

Schirhagl, R. (Member)  
2014 → ...

**External adviser**

Schirhagl, R. (Examiner)  
2014 → ...

**Frontiers in Materials : Translational Materials Science (Journal)**

Schirhagl, R. (Editorial board member)  
2014 → ...

**W.J. Kolff Institute for Biomedical Engineering and Materials Science (KOLFF) (Organisational unit)**

Schirhagl, R. (Member)  
2014 → ...

#### **The German Chemical Society (GDCh) (External organisation)**

Schirhagl, R. (Member)

2013 → ...

#### **QSIT - Quantum Science and Technology (External organisation)**

Schirhagl, R. (Member)

2012 → 2014

#### **The Royal Society of Chemistry (RSC) (External organisation)**

Schirhagl, R. (Member)

2012 → ...

#### **The Society for Molecular Imprinting (SMI) (External organisation)**

Schirhagl, R. (Member)

2012 → ...

#### **Austrian Scientists in Northern America (ASCINA) (External organisation)**

Schirhagl, R. (Member)

2010 → ...

#### **Austrian Chemical Society, Medicinal Chemistry (External organisation)**

Schirhagl, R. (Member)

2007 → ...

## **Research output**

#### **Oxidative stress biomarkers in assisted reproductive technologies: From follicular redox biology to clinical translation**

Lin, N., van Zomeren, K., Plosch, T., Hofsink, N., Zhou, X., Tietge, U. J. F., Cantineau, A., Schirhagl, R. & Hoek, A., 13-Apr-2026, (E-pub ahead of print) In: *Redox Biology*. 93, 16 p., 104167.

#### **Amphiphilic Janus nanoparticles for image-guided cancer treatment: cell internalization mechanism, molecular action, challenges, and outlook**

Madni, A., Iqbal, M. Z., Schirhagl, R., Khan, W. S. & Bajwa, S. Z., 28-Nov-2025, In: *Journal of materials chemistry b*. 13, 44, p. 14239-14259 21 p.

#### **Quantum Sensing of Free Radicals in Macrophages Reveals Early Autophagy-lysosome regulation in an Atherosclerosis cell model**

Fan, S., Gao, H., Nieuwhof, W., Mulder, T., Fumelli, B., Li, R., Sharmin, R., Niora, M., Sorensen, K. B., Haan, W. D., Santos, H. A. & Schirhagl, R., Nov-2025, In: *Redox Biology*. 87, 10 p., 103825.

#### **Fluorescent Nanodiamonds Based Theranostic Platform for pH-Sensitive Drug Delivery and Quantum Sensing**

Wu, K., Fan, S., Zhang, Y., Woudstra, W., Mulder, T., Boscher Navarro, L., van Dijken, J., Loos, K. & Schirhagl, R., 9-Oct-2025, In: *Advanced Functional Materials*. 36, 17, 11 p., e14294.

#### **Quantum sensing to monitor changes in free radical generation by intracellular vesicles of polarized macrophages**

Mzyk, A., Reyes-San-Martin, C., Doğan, Y., Woudstra, W., Zhang, Y., Yilmaz, E., Bron, R., de Haan-Visser, W., Berg-Sorensen, K. & Schirhagl, R., 1-Jun-2025, In: *Acta Biomaterialia*. 199, p. 315-323 9 p.

#### **In Vivo Nanodiamond Quantum Sensing of Free Radicals in *Caenorhabditis elegans* Models**

Fan, S., Zhang, Y., Ainslie, A. P., Seinstra, R., Zhang, T., Nollen, E. & Schirhagl, R., 10-Apr-2025, In: *Advanced science*. 12, 14, 9 p., 2412300.

#### **Integrating melt electrowriting (MEW) PCL scaffolds with fibroblast-laden hydrogel toward vascularized skin tissue engineering**

Wu, X., Zhao, F., Wang, H., Schirhagl, R. & Włodarczyk-Biegun, M. K., Apr-2025, In: *Materials Today Bio*. 31, 17 p., 101593.

### **Optimizing Data Processing for Nanodiamond Based Relaxometry**

Vedelaar, T. A., Hamoh, T. H., Martinez, F. P. P., Chipaux, M. & Schirhagl, R., Apr-2025, In: Advanced Quantum Technologies. 8, 4, 9 p., 2300109.

### **Follicle-stimulating hormone stimulates free radical generation without inducing substantial oxidative stress in human granulosa cells**

Lin, N., van Zomeren, K. C., Plosch, T., Hofsink, N., van Veen, T., Li, H. T., Lin, J., Zhou, X., Groen, H., Tietge, U. J. F., Cantineau, A., Schirhagl, R. & Hoek, A., 2025, In: Human reproduction open. 2025, 2, 17 p., hoaf007.

### **Quantum Sensing Unravels Antioxidant Efficacy Within PCL/Matrigel Skin Equivalents**

Wu, X., Koch, M., Martínez, F. P. P., Schirhagl, R. & Włodarczyk-Biegun, M. K., 5-Dec-2024, In: Small. 20, 49, 15 p., 2403729.

### **In silico vaccine design: Targeting highly epitopic regions of Clostridium perfringens type D epsilon toxin and Clostridium novyi type B alpha toxin for optimal immunogenicity**

Ashoori, N., Ranjbar, M. M. & Schirhagl, R., Dec-2024, In: Computational and Structural Biotechnology Journal. 25, p. 153-164 12 p.

### **Two-Dimensional MoS<sub>2</sub>-Based Photodetectors**

Ye, L., Gan, X. & Schirhagl, R., Nov-2024, In: Sustainability. 16, 22, 36 p., 10137.

### **Diamond Surfaces with Lateral Gradients for Systematic Optimization of Surface Chemistry for Relaxometry: a Low-Pressure Plasma-Based Approach**

Tian, Y., Ortiz Moreno, A. R., Chipaux, M., Wu, K., Perona Martinez, F. P., Shirzad, H., Hamoh, T., Mzyk, A., van Rijn, P. & Schirhagl, R., 29-Oct-2024, In: Langmuir. 40, 43, p. 23007-23017 11 p.

### **Free radical detection in precision-cut mouse liver slices with diamond-based quantum sensing**

Zhang, Y., Sigaeva, A., Elías-Llumbet, A., Fan, S., Woudstra, W., de Boer, R., Escobar, E., Reyes-San-Martin, C., Kisabacak, R., Oosterhuis, D., Gorter, A. R., Coenen, B., Perona Martinez, F. P., van den Bogaart, G., Olinga, P. & Schirhagl, R., 22-Oct-2024, In: Proceedings of the National Academy of Sciences of the United States of America. 121, 43, 10 p., e2317921121.

### **Solar-based aerator with water quality monitoring in vannamei shrimp pond**

Pratama, I. P. E. W., Kusuma, F. A., Mujiyanti, S. F., Schirhagl, R. & Nanta, T. L., Oct-2024, In: International Journal of Electrical and Computer Engineering. 14, 5, p. 5048-5054 7 p.

### **The Interplay between Mechanoregulation and ROS in Heart Physiology, Disease, and Regeneration**

Elias-Llumbet, A., Sharmin, R., Berg-Sorensen, K., Schirhagl, R. & Mzyk, A., 13-Sept-2024, In: Advanced healthcare materials. 13, 23, 17 p., 2400952.

### **Diamond-based quantum sensing of free radicals in migrating human breast cancer cells**

Reyes-San-Martin, C., Elías-Llumbet, A., Escobar-Chaves, E., Manterola, M., Mzyk, A. & Schirhagl, R., Sept-2024, In: Carbon. 228, 12 p., 119405.

### **Verifying the cytotoxicity of a biodegradable zinc alloy with nanodiamond sensors**

Wojtas, D., Mzyk, A., Li, R., Zehetbauer, M., Schafner, E., Jarzębska, A., Sułkowski, B. & Schirhagl, R., Sept-2024, In: Biomaterials Advances. 162, 13 p., 213927.

### **Towards using fluorescent nanodiamonds for studying cell migration**

Reyes-San-Martin, C., Elías-Llumbet, A., Hamoh, T., Sharmin, R., Zhang, Y., Hermann, A., Woudstra, W., Mzyk, A. & Schirhagl, R., 10-Aug-2024, In: Cancer Nanotechnology. 15, 14 p., 44.

### **Dynamics for High-Sensitivity Detection of Free Radicals in Primary Bronchial Epithelial Cells upon Stimulation with Cigarette Smoke Extract**

Zhang, Y., Sigaeva, A., Fan, S., Norouzi, N., Zheng, X., Heijink, I. H., Slebos, D. J., Pouwels, S. D. & Schirhagl, R., 7-Aug-2024, In: Nano Letters. 24, 31, p. 9650-9657 8 p.

#### **Timing and Mechanisms of Nanodiamond Uptake in Colon Cancer Cells**

Sigaeva, A., Li, R., van Laar, J. J., Wierenga, L. & Schirhagl, R., 25-Jul-2024, In: Nanotechnology, Science and Applications. 17, p. 147-166 20 p.

#### **What is the impact of plastic deformation on cytocompatibility of biodegradable Zn-Mg alloys?**

Wojtas, D., Trembecka-Wójciga, K., Gieleciak, M., Bigos, A., Brudecki, K., Przybysz-Gloc, S., Schirhagl, R., Mzyk, A. & Jarzębska, A., 13-Jun-2024, In: Materials Advances. 5, 14, p. 5958-5973 16 p.

#### **Melt electrowritten poly-lactic acid /nanodiamond scaffolds towards wound-healing patches**

Wu, X., Li, W., Herlah, L., Koch, M., Wang, H., Schirhagl, R. & Włodarczyk-Biegun, M. K., Jun-2024, In: Materials Today Bio. 26, 13 p., 101112.

#### **Quantum Sensing of Free Radical Generation in Mitochondria of Human Keratinocytes during UVB Exposure**

Fan, S., Lopez Llorens, L., Perona Martinez, F. P. & Schirhagl, R., 24-May-2024, In: ACS Sensors. 9, 5, p. 2440-2446 7 p.

#### **Microstructure-properties relation of hydrostatically extruded absorbable zinc alloys: Effect of Mg and Cu addition on corrosion properties and biocompatibility**

Jarzębska, A., Gieleciak, M., Bigos, A., Maj, Ł., Trembecka-Wójciga, K., Bugajska, M., Bieda, M., Rogal, Ł., Kawałko, J., Przybysz, S., Wojtas, D., Mzyk, A. & Schirhagl, R., May-2024, In: Journal of Materials Research and Technology. 30, p. 283-294 12 p.

#### **Development of cholesterol imprinted polymer-based interfaces as smart sensors for detection of cholesterol in clinical samples**

Hayat, H., Awan, F. R., Aziz, A., Schirhagl, R., Afzal, A., Mujahid, A., Jamil, A., Asim, T., Khan, W. S. & Bajwa, S. Z., 14-Feb-2024, In: Journal of materials research. 39, 3, p. 459-470 12 p.

#### **Quantum Sensing of Free Radical Generation in Mitochondria of Single Heart Muscle Cells during Hypoxia and Reoxygenation**

Fan, S., Gao, H., Zhang, Y., Nie, L., Bártolo, R., Bron, R., Santos, H. A. & Schirhagl, R., 30-Jan-2024, In: Acs Nano. 18, 4, p. 2982-2991 10 p.

#### **Measuring free radicals with relaxometry: Pioneering steps for measurements in human semen**

Li, H. T., Schirhagl, R., Eliveld, J., Reyes San Martin, C., Pronk, I., Hoek, A., Cantineau, A. & Mzyk, A., Dec-2023, In: Diamond and Related Materials. 140, A, 7 p., 110388.

#### **Antimicrobial Studies of Black Silicon and Black Diamond Using Gram-Positive Bacteria**

Norouzi, N., Woudstra, W., Smith, E. J. W., Zulpukarova, G., Yao, K., Damle, V. G., Schirhagl, R., May, P. W. & Kamp, T., Nov-2023, In: Advanced Engineering Materials. 25, 21, 11 p., 2301031.

#### **Quantum Sensing for Detection of Zinc-Triggered Free Radicals in Endothelial Cells**

Wojtas, D., Li, R., Jarzębska, A., Sułkowski, B., Zehetbauer, M., Schafler, E., Wierzbowski, K., Mzyk, A. & Schirhagl, R., Nov-2023, In: Advanced Quantum Technologies. 6, 11, 13 p., 2300174.

#### **Quantum Sensing for Real-Time Monitoring of Drug Efficacy in Synovial Fluid from Arthritis Patients**

Eliás-Llumbet, A., Tian, Y., Reyes-San-Martin, C., Reina-Mahecha, A., Damle, V., Morita, A., van der Veen, H. C., Sharma, P. K., Sandovici, M., Mzyk, A. & Schirhagl, R., 27-Sept-2023, In: Nano Letters. 23, 18, p. 8406-8410 5 p.

#### **Quantum Sensing of Free Radicals in Primary Human Granulosa Cells with Nanoscale Resolution**

Lin, N., van Zomeren, K., van Veen, T., Mzyk, A., Zhang, Y., Zhou, X., Plosch, T., Tietge, U. J. F., Cantineau, A., Hoek, A. & Schirhagl, R., 27-Sept-2023, In: ACS central science. 9, 9, p. 1784-1798 15 p.

#### **Fluorescent Nanodiamonds for Tracking Single Polymer Particles in Cells and Tissues**

Li, R., Vedelaar, T. A., Sigaeva, A., Zhang, Y., Wu, K., Wang, H., Wu, X., Olinga, P., Włodarczyk-Biegun, M. K. & Schirhagl, R., 5-Sept-2023, In: *Analytical Chemistry*. 95, 35, p. 13046-13054 9 p.

#### **Host-device interactions: exposure of lung epithelial cells and fibroblasts to nickel, titanium, or nitinol affect proliferation, reactive oxygen species production, and cellular signaling**

Pouwels, S. D., Sigaeva, A., de Boer, S., Eichhorn, I. A., Koll, L., Kuipers, J., Schirhagl, R., Heijink, I. H., Burgess, J. K. & Slebos, D.-J., 24-Jul-2023, In: *Journal of Materials Science : Materials in Medicine*. 34, 7, p. 38 13 p.

#### **A mesh network of MnO nanowires and CNTs reinforced by molecularly imprinted structures for the selective detection of para-nitrophenol**

Tehseen, B., Rehman, A., Schirhagl, R., Ashraf, N., Ullah, A., Asim, T., Khan, W. S. & Bajwa, S. Z., Jul-2023, In: *Journal of materials research*. 38, 14, p. 3560-3571 12 p.

#### **Melt electrowritten scaffolds containing fluorescent nanodiamonds for improved mechanical properties and degradation monitoring**

Wu, X., Vedelaar, T., Li, R., Schirhagl, R., Kamperman, M. & Włodarczyk-Biegun, M. K., Jul-2023, In: *Bioprinting*. 32, 10 p., e00288.

#### **Prospects of Using Machine Learning and Diamond Nanosensing for High Sensitivity SARS-CoV-2 Diagnosis**

Qureshi, S. A., Aman, H. & Schirhagl, R., Jul-2023, In: *Magnetochemistry*. 9, 7, 15 p., 171.

#### **Biocompatible Film-Coating of Magnetic Soft Robots for Mucoadhesive Locomotion**

Wang, C., Mzyk, A., Schirhagl, R., Misra, S. & Kalpathy Venkiteswaran, V., 23-Jun-2023, In: *Advanced Materials Technologies*. 8, 12, 13 p., 2201813.

#### **Diamond Quantum Sensing Revealing the Relation between Free Radicals and Huntington's Disease**

Fan, S., Nie, L., Zhang, Y., Ustyantseva, E., Woudstra, W., Kampinga, H. H. & Schirhagl, R., 21-Jun-2023, In: *ACS central science*. 9, 7, p. 1427-1436 10 p.

#### **Fluorescent nanodiamond labels: Size and concentration matters for sperm cell viability**

San-Martin, C. R., Zhang, Y., Hamoh, T., Berendse, L., Klijn, C., Li, R., Sigaeva, A., Kawałko, J., Li, H. T., Tehrani, J., Mzyk, A. & Schirhagl, R., Jun-2023, In: *Materials Today Bio*. 20, 7 p., 100629.

#### **Lipid peroxidation in diamond supported bilayers**

Ortiz Moreno, A. R., Li, R., Wu, K. & Schirhagl, R., 7-May-2023, In: *Nanoscale*. 15, 17, p. 7920-7928 9 p.

#### **Elastic moduli of polyelectrolyte multilayer films regulate endothelium-blood interaction under dynamic conditions**

Imbir, G., Trembecka-Wójciga, K., Ozga, P., Schirhagl, R. & Mzyk, A., May-2023, In: *Colloids and Surfaces B: Biointerfaces*. 225, 9 p., 113269.

#### **Fast, Broad-Band Magnetic Resonance Spectroscopy with Diamond Widefield Relaxometry**

Mignon, C., Ortiz Moreno, A. R., Shirzad, H., Padamati, S. K., Damle, V. G., Ong, Y., Schirhagl, R. & Chipaux, M., 28-Apr-2023, In: *ACS Sensors*. 8, 4, p. 1667-1675 9 p.

#### **Intracellular behavior of nanodiamonds functionalized with a zwitterionic shielding moiety**

Sigaeva, A., Merz, V., Sharmin, R., Schirhagl, R. & Krueger, A., 28-Apr-2023, In: *Journal of Materials Chemistry C*. 11, 20, p. 6642-6650 9 p.

#### **Recent advancements in polymer matrix nanocomposites for bone tissue engineering applications**

Sagadevan, S., Schirhagl, R., Rahman, M. Z., Bin Ismail, M. F., Lett, J. A., Fatimah, I., Mohd Kaus, N. H. & Oh, W. C., Apr-2023, In: *Journal of drug delivery science and technology*. 82, 13 p., 104313.

#### **Detecting the metabolism of individual yeast mutant strain cells when aged, stressed or treated with antioxidants with diamond magnetometry**

Morita, A., Nusantara, A. C., Myzk, A., Perona Martinez, F. P., Hamoh, T., Damle, V. G., Laan, K. J. V. D., Sigaeva, A., Vedelaar, T., Chang, M., Chipaux, M. & Schirhagl, R., Feb-2023, In: Nano Today. 48, 13 p., 101704.

#### **Diamond Relaxometry as a Tool to Investigate the Free Radical Dialogue between Macrophages and Bacteria**

Wu, K., Nie, L., Nusantara, A. C., Woudstra, W., Vedelaar, T., Sigaeva, A. & Schirhagl, R., 11-Jan-2023, In: Acs Nano. 17, 2, p. 1100-1111 12 p.

#### **Relaxometry with Nitrogen Vacancy (NV) Centers in Diamond**

Mzyk, A., Sigaeva, A. & Schirhagl, R., 20-Dec-2022, In: Accounts of Chemical Research. 55, 24, p. 3572-3580 9 p.

#### **Intracellular Relaxometry, Challenges, and Future Directions**

Sigaeva, A., Norouzi, N. & Schirhagl, R., 23-Nov-2022, In: ACS central science. 8, 11, p. 1484-1489 6 p.

#### **Intracellular Quantum Sensing of Free-Radical Generation Induced by Acetaminophen (APAP) in the Cytosol, in Mitochondria and the Nucleus of Macrophages**

Sharmin, R., Nusantara, A. C., Nie, L., Wu, K., Elias Llumbet, A., Woudstra, W., Mzyk, A. & Schirhagl, R., 10-Nov-2022, In: ACS Sensors. 7, 11, p. 3326-3334 9 p.

#### **Diamond-Based Nanoscale Quantum Relaxometry for Sensing Free Radical Production in Cells**

Sigaeva, A., Shirzad, H., Perona Martinez, F., Nusantara, A. C., Mougios, N., Chipaux, M. & Schirhagl, R., 3-Nov-2022, In: Small. 18, 44, 13 p., 2105750.

#### **Relaxometry for detecting free radical generation during Bacteria's response to antibiotics**

Norouzi, N., Nusantara, A. C., Ong, Y., Hamoh, T., Nie, L., Morita, A., Zhang, Y., Mzyk, A. & Schirhagl, R., 31-Oct-2022, In: Carbon. 199, p. 444-452 9 p.

#### **Detecting free radicals post viral infections**

Damle, V. G., Wu, K., Arouri, D. J. & Schirhagl, R., Oct-2022, In: Free Radical Biology and Medicine. 191, p. 8-23 16 p.

#### **Single-Particle Tracking and Trajectory Analysis of Fluorescent Nanodiamonds in Cell-Free Environment and Live Cells**

Sigaeva, A., Hochstetter, A., Bouyim, S., Chipaux, M., Stejfova, M., Cigler, P. & Schirhagl, R., 28-Sept-2022, In: Small. 18, 39, 17 p., 2201395.

#### **Functionalized Fluorescent Nanodiamonds for Simultaneous Drug Delivery and Quantum Sensing in HeLa Cells**

Tian, Y., Nusantara, A. C., Hamoh, T., Mzyk, A., Tian, X., Martinez, F. P., Li, R., Permentier, H. P. & Schirhagl, R., 31-Aug-2022, In: ACS Applied Materials & Interfaces. 14, 34, p. 39265-39273 9 p.

#### **Insight into a Fenton-like Reaction Using Nanodiamond Based Relaxometry**

Padamati, S. K., Vedelaar, T. A., Martinez, F. P., Nusantara, A. C. & Schirhagl, R., Jul-2022, In: Nanomaterials. 12, 14, 12 p., 2422.

#### **Nanoscale MRI for Selective Labeling and Localized Free Radical Measurements in the Acrosomes of Single Sperm Cells**

Reyes-San-Martin, C., Hamoh, T., Zhang, Y., Berendse, L., Klijn, C., Li, R., Llumbet, A. E., Sigaeva, A., Kawałko, J., Mzyk, A. & Schirhagl, R., 30-Jun-2022, In: Acs Nano. 16, 7, p. 10701-10710 10 p.

#### **Applying NV center-based quantum sensing to study intracellular free radical response upon viral infections**

Wu, K., Vedelaar, T. A., Damle, V. G., Morita, A., Mougnaud, J., Reyes San Martin, C., Zhang, Y., van der Pol, D. P. I., Ende-Metselaar, H., Rodenhuis-Zybert, I. & Schirhagl, R., 1-Jun-2022, In: Redox Biology. 52, 11 p., 102279.

#### **Quantum Sensing of Free Radicals in Primary Human Dendritic Cells**

Nie, L., Nusantara, A. C., Damle, V. G., Baranov, M. V., Chipaux, M., Reyes-San-Martin, C., Hamoh, T., Epperla, C. P., Guricova, M., Cigler, P., Van Den Bogaart, G. & Schirhagl, R., 23-Feb-2022, In: Nano Letters. 22, 4, p. 1818-1825 8 p.

#### **Following Polymer Degradation with Nanodiamond Magnetometry**

Li, R., Vedelaar, T., Mzyk, A., Morita, A., Padamati, S. K. & Schirhagl, R., 28-Jan-2022, In: ACS Sensors. 1, p. 123-130

#### **Diamond Color Centers in Diamonds for Chemical and Biochemical Analysis and Visualization**

Mzyk, A., Ong, Y., Ortiz Moreno, A. R., Padamati, S. K., Zhang, Y., Reyes-San-Martin, C. A. & Schirhagl, R., 11-Jan-2022, In: Analytical Chemistry. 94, 1, p. 225-249 25 p.

#### **Nanotechnology from lab to industry - a look at current trends**

Rambaran, T. & Schirhagl, R., 2022, In: Nanoscale advances. 4, p. 3664-3675 12 p.

#### **Fluorescent Nanodiamonds for Detecting Free-Radical Generation in Real Time during Shear Stress in Human Umbilical Vein Endothelial Cells**

Sharmin, R., Hamoh, T., Sigaeva, A., Mzyk, A., Damle, V. G., Morita, A., Vedelaar, T. & Schirhagl, R., 24-Dec-2021, In: ACS Sensors. 6, 12, p. 4349-4359 11 p.

#### **Drug delivery and antimicrobial studies of chitosan-alginate based hydroxyapatite bioscaffolds formed by the Casein micelle assisted synthesis**

Jariya, S. A. I., Padmanabhan, V. P., Kulandaivelu, R., Prakash, N., Mohammad, F., Al-Lohedan, H. A., Paiman, S., Schirhagl, R., Hossain, M. A. M. & Sagadevan, S., 1-Nov-2021, In: Materials Chemistry and Physics. 272, 11 p., 125019.

#### **Male subfertility and oxidative stress**

Evans, E. P. P., Scholten, J. T. M., Mzyk, A., Reyes-San-Martin, C., Llumbet, A. E., Hamoh, T., Arts, E. G. J. M., Schirhagl, R. & Cantineau, A. E. P., Oct-2021, In: Redox Biology. 46, 17 p., 102071.

#### **Pharmacodynamic studies of fluorescent diamond carriers of doxorubicin in liver cancer cells and colorectal cancer organoids**

Firestein, R., Marcinkiewicz, C., Nie, L., Chua, H. K., Quesada, I. V., Torelli, M., Sternberg, M., Gligorijevic, B., Shenderova, O., Schirhagl, R. & Feuerstein, G. Z., Sept-2021, In: Nanotechnology, Science and Applications. 14, p. 139-159 21 p.

#### **Not all cells are created equal - endosomal escape in fluorescent nanodiamonds in different cells**

Zhang, Y., Sharmin, R., Sigaeva, A., Klijn, C. W. M., Mzyk, A. & Schirhagl, R., 21-Aug-2021, In: Nanoscale. 13, p. 13294-13300 7 p.

#### **pH Sensitive Dextran Coated Fluorescent Nanodiamonds as a Biomarker for HeLa Cells Endocytic Pathway and Increased Cellular Uptake**

Nie, L., Zhang, Y., Li, L., van Rijn, P. & Schirhagl, R., 15-Jul-2021, In: Nanomaterials. 11, 7, p. 1-11 11 p., 1837.

#### **Novel uric acid-based nano organocatalyst with phosphorous acid tags: Application for synthesis of new biologically-interest pyridines with indole moieties via a cooperative vinylogous anomeric based oxidation**

Kalhor, S., Zarei, M., Sepehrmansourie, H., Zolfigol, M. A., Shi, H., Wang, J., Arjomandi, J., Hasani, M. & Schirhagl, R., May-2021, In: Molecular catalysis. 507, 16 p., 111549.

#### **Quantum monitoring of cellular metabolic activities in single mitochondria**

Nie, L., Nusantara, A. C., Damle, V. G., Sharmin, R., Evans, E. P. P., Hemelaar, S. R., van der Laan, K. J., Li, R., Martinez, F. P. P., Vedelaar, T., Chipaux, M. & Schirhagl, R., May-2021, In: Science Advances. 7, 21, 8 p., 0573.

#### **Recent advances in natural polymer-based hydroxyapatite scaffolds: Properties and applications**

Lett, J. A., Sagadevan, S., Fatimah, I., Hoque, M. E., Lokanathan, Y., Leonard, E., Alshahateet, S. F., Schirhagl, R. & Oh, W. C., 5-Apr-2021, In: European Polymer Journal. 148, 18 p., 110360.

#### **Membrane-Based Scanning Force Microscopy**

Hälg, D., Gisler, T., Tsaturyan, Y., Catalini, L., Grob, U., Krass, M. D., Héritier, M., Mattiat, H., Thamm, A. K., Schirhagl, R., Langman, E. C., Schliesser, A., Degen, C. L. & Eichler, A., Feb-2021, In: Physical Review Applied. 15, 2, 6 p., L021001.

**Synthesis of biological based hennotannic acid-based salts over porous bismuth coordination polymer with phosphorous acid tags**

Babae, S., Zarei, M., Zolfigol, M. A., Khazalpour, S., Hasani, M., Rinner, U., Schirhagl, R., Norouzi, N. & Rostamnia, S., 22-Jan-2021, In: RSC Advances. 11, 4, p. 2141-2157 17 p.

**Nanodiamond Relaxometry-Based Detection of Free-Radical Species When Produced in Chemical Reactions in Biologically Relevant Conditions**

Martinez, F. P., Nusantara, A. C., Chipaux, M., Padamati, S. K. & Schirhagl, R., 24-Dec-2020, In: ACS Sensors. 5, 12, p. 3862-3869 8 p.

**Influence of sonication on the physicochemical and biological characteristics of selenium-substituted hydroxyapatites**

Padmanabhan, V. P., Kulandaivelu, R., Venkatachalam, V., Veerla, S. C., Mohammad, F., Al-Lohedan, H. A., Oh, W. C., Schirhagl, R., Obulapuram, P. K., Hoque, M. E. & Sagadevan, S., 28-Oct-2020, In: New Journal of Chemistry. 44, 40, p. 17453-17464 12 p.

**Targeting Nanodiamonds to the Nucleus in Yeast Cells**

Morita, A., Hamoh, T., Sigaeva, A., Norouzi, N., Nagl, A., van der Laan, K. J., Evans, E. P. P. & Schirhagl, R., Oct-2020, In: Nanomaterials. 10, 10, p. 1-10 10 p.

**Quantum monitoring the metabolism of individual yeast mutant strain cells when aged, stressed or treated with antioxidant**

Morita, A., Nusantara, C., Perona Martinez, F., Hamoh, T., Damle, V., Laan, van der, K., Sigaeva, A., Vedelaar, T., Chang, M., Chipaux, M. & Schirhagl, R., 31-Jul-2020, arXiv, 36 p. (ArXiv).

**Micro Versus Macro: The Effect of Environmental Confinement on Cellular Nanoparticle Uptake**

Damle, V. G., Sharmin, R., Morita, A., Nie, L. & Schirhagl, R., 24-Jul-2020, In: Frontiers in Bioengineering and Biotechnology. 8, 13 p., 869.

**Effect of medium and aggregation on antibacterial activity of nanodiamonds**

Norouzi, N., Ong, Y., Damle, V. G., Najafi, M. B. H. & Schirhagl, R., Jul-2020, In: Materials science & engineering c- Biomimetic and supramolecular systems. 112, 8 p., 110930.

**High Temperature Treatment of Diamond Particles Toward Enhancement of Their Quantum Properties**

Torelli, M. D., Nunn, N. A., Jones, Z. R., Vedelaar, T., Padamati, S. K., Schirhagl, R., Hamers, R. J., Shames, A. I., Danilov, E. O., Zaitsev, A. & Shenderova, O. A., 10-Jun-2020, In: Frontiers of Physics. 8, 11 p., 205.

**Influence of diamond crystal orientation on the interaction with biological matter**

Damle, V., Wu, K., De Luca, O., Orti-Casan, N., Norouzi, N., Morita, A., de Vries, J., Kaper, H., Zuhorn, I. S., Eisel, U., Vanpoucke, D. E. P., Rudolf, P. & Schirhagl, R., Jun-2020, In: Carbon. 162, p. 1-12 12 p.

**Polyelectrolyte Multilayer Films Modification with Ag and rGO Influences Platelets Activation and Aggregate Formation under In Vitro Blood Flow**

Imbir, G., Mzyk, A., Trembecka-Wójciga, K., Jasek-Gajda, E., Plutecka, H., Schirhagl, R. & Major, R., May-2020, In: Nanomaterials (Basel, Switzerland). 10, 5, 17 p., 859.

**The Fate of Lipid-Coated and Uncoated Fluorescent Nanodiamonds during Cell Division in Yeast**

Morita, A., Hamoh, T., Martinez, F. P. P., Chipaux, M., Sigaeva, A., Mignon, C., Laan, K. J. V. D., Hochstetter, A. & Schirhagl, R., Mar-2020, In: Nanomaterials (Basel, Switzerland). 10, 3, 17 p., 516.

**Evaluation of the Oxidative Stress Response of Aging Yeast Cells in Response to Internalization of Fluorescent Nanodiamond Biosensors**

van der Laan, K. J., Morita, A., Perona-Martinez, F. P. & Schirhagl, R., 20-Feb-2020, In: Nanomaterials (Basel, Switzerland). 10, 2, 13 p., 372.

**Exploring the thumbprints of Ag-hydroxyapatite composite as a surface coating bone material for the implants**

Lett, J. A., Sagadevan, S., Paiman, S., Mohammad, F., Schirhagl, R., Leonard, E., Alshahateet, S. F. & Oh, W.-C., 2020, In: Journal of Materials Research and Technology. 9, 6, p. 12824-12833 10 p.

**Non enzymatic fluorometric determination of glucose by using quenchable g-C<sub>3</sub>N<sub>4</sub> quantum dots**

Gan, X., Zhao, H., Schirhagl, R. & Quan, X., Dec-2019, In: Microchimica Acta. 186, 12, 10 p., 779.

**Nanodiamond uptake in colon cancer cells: the influence of direction and trypsin-EDTA treatment**

Sigaeva, A., Morita, A., Hemelaar, S. R. & Schirhagl, R., 7-Oct-2019, In: Nanoscale. 11, 37, p. 17357-17367 11 p.

**Smart probe for simultaneous detection of copper ion, pyrophosphate, and alkaline phosphatase in vitro and in clinical samples**

Kiran, S., Khatik, R. & Schirhagl, R., Sept-2019, In: Analytical and Bioanalytical Chemistry. 411, 24, p. 6475-6485 11 p.

**Nanodiamond for Sample Preparation in Proteomics**

Perona Martinez, F., Nagl, A., Guluzade, S. & Schirhagl, R., 6-Aug-2019, In: Analytical Chemistry. 91, 15, p. 9800-9805 6 p.

**Paving the way for intracellular detection of free radicals with nanodiamond magnetometry**

Sigaeva, A., Martinez, F. P., Nusantara, A. C., Mougios, N. & Schirhagl, R., 1-Aug-2019, In: Free Radical Biology and Medicine. 139, S1, p. S50 1 p.

**Cell Uptake of Lipid-Coated Diamond**

Morita, A., Perona Martinez, F., Chipaux, M., Jamot, N., Hemelaar, S., Laan, van der, K. & Schirhagl, R., Aug-2019, In: Particle and Particle Systems Characterization. 36, 8, 8 p., 1900116.

**Facile in situ generation of bismuth tungstate nanosheet-multiwalled carbon nanotube composite as unconventional affinity material for quartz crystal microbalance detection of antibiotics**

Munawar, A., Schirhagl, R., Rehman, A., Shaheen, A., Taj, A., Bano, K., Bassous, N. J., Webster, T. J., Khan, W. S. & Bajwa, S. Z., 5-Jul-2019, In: Journal of hazardous materials. 373, p. 50-59 10 p.

**Optical Detection of Intracellular Quantities Using Nanoscale Technologies**

Sigaeva, A., Ong, Y., Damle, V. G., Morita, A., van der Laan, K. J. & Schirhagl, R., Jul-2019, In: Accounts of Chemical Research. 52, 7, p. 1739-1749 11 p.

**Nanosensors for diagnosis with optical, electric and mechanical transducers**

Munawar, A., Ong, Y., Schirhagl, R., Tahir, M. A., Khan, W. S. & Bajwa, S. Z., 27-Feb-2019, In: RSC Advances. 9, p. 6793-6803 11 p.

**Toward Using Fluorescent Nanodiamonds To Study Chronological Aging in *Saccharomyces cerevisiae***

van der Laan, K., Naulleau, J., Damle, V. G., Sigaeva, A., Jamot, N., Perona Martinez, F. P., Chipaux, M. & Schirhagl, R., 20-Nov-2018, In: Analytical Chemistry. 90, 22, p. 13506-13513 8 p.

**Two-dimensional nanomaterial based sensors for heavy metal ions**

Gan, X., Zhao, H., Schirhagl, R. & Quan, X., Oct-2018, In: Mikrochimica Acta. 185, 10, 30 p., 478.

**Interaction of nanodiamonds with bacteria**

Ong, S. Y., van Harmelen, R. J. J., Norouzi, N., Offens, F., Habibi Najafi, M. B., Schirhagl, R. & Venema, I., 26-Sept-2018, In: Nanoscale. 10, 36, p. 17117-17124 8 p.

**Instantaneous magnetic resonance spectroscopy of a sample**

Chipaux, M. S. (Inventor) & Schirhagl, R. (Inventor), 12-Jul-2018, Patent No. WO2018128543, Priority date 6-Jan-2017

### **Nanodiamonds and Their Applications in Cells**

Chipaux, M., van der Laan, K. J., Hemelaar, S. R., Hasani, M., Zheng, T. & Schirhagl, R., 14-Jun-2018, In: *Small*. 14, 24, 25 p., 1704263.

### **Fluorescent nanodiamonds: potential free radical detectors in live cells**

Sigaeva, A., Hamoh, T., Perona, F. & Schirhagl, R., 20-May-2018, In: *Free Radical Biology and Medicine*. 120, p. S87-S87 1 p.

### **Nanodiamonds for In Vivo Applications**

van der Laan, K., Hasani, M., Zheng, T. & Schirhagl, R., 9-May-2018, In: *Small*. 14, 19, 17 p., 1703838.

### **The Response of HeLa Cells to Fluorescent NanoDiamond Uptake**

Hemelaar, S. R., Saspaanithy, B., L'Hommelet, S. R. M., Perona Martinez, F. P., van der Laan, K. J. & Schirhagl, R., 26-Jan-2018, In: *Sensors*. 18, 2, 15 p., 355.

### **Method and detector for microscopic measurement by means of a colour center**

Schirhagl, R. (Inventor), Perona Martinez, F. P. (Inventor) & Chipaux, M. S. (Inventor), 21-Dec-2017, Patent No. WO2017217847, Priority date 16-Jun-2016

### **Recombinant Protein Polymers for Colloidal Stabilization and Improvement of Cellular Uptake of Diamond Nanosensors**

Zheng, T., Martinez, F. P., Storm, I. M., Rombouts, W., Sprakel, J., Schirhagl, R. & de Vries, R., 5-Dec-2017, In: *Analytical Chemistry*. 89, 23, p. 12812-12820 9 p.

### **Synthesis of novel magnetic nanoparticles with urea or urethane moieties: Applications as catalysts in the Strecker synthesis of alpha-aminonitriles**

Bagheri, S., Zolfigol, M. A., Schirhagl, R., Hasani, M., Stuart, M. C. A. & Nagl, A., Dec-2017, In: *Applied Organometallic Chemistry*. 31, 12, 10 p., e3883.

### **Nanoparticle discrimination based on wavelength and lifetime-multiplexed cathodoluminescence microscopy**

Garming, M. W. H., Weppelman, I. G. C., de Boer, P., Martínez, F. P., Schirhagl, R., Hoogenboom, J. P. & Moerland, R. J., 14-Sept-2017, In: *Nanoscale*. 9, 34, p. 12727-12734 8 p.

### **{[1,4-DHPyrazine][C(CN)<sub>3</sub>]}<sub>2</sub> as a New Nano Molten Salt Catalyst for the Synthesis of Novel Piperazine Based bis(4-hydroxy-2H-chromen-2-one) Derivatives**

Bagheri, S., Zolfigol, M. A., Schirhagl, R. & Hasani, M., Aug-2017, In: *Catalysis Letters*. 147, 8, p. 2083-2099 17 p.

### **Generally Applicable Transformation Protocols for Fluorescent Nanodiamond Internalization into Cells**

Hemelaar, S. R., van der Laan, K. J., Hinterding, S. R., Koot, M. V., Ellermann, E., Perona-Martinez, F. P., Roig, D., Hommelet, S., Novarina, D., Takahashi, H., Chang, M. & Schirhagl, R., 19-Jul-2017, In: *Scientific Reports*. 7, 7 p., 5862.

### **Towards Magnetic Mapping of Cellular Organelles using Fluorescent Nanodiamonds**

Hemelaar, S. R., van der Laan, K. J. & Schirhagl, R., Jul-2017, In: *Free Radical Biology and Medicine*. 108, p. S106-S106 1 p.

### **Application of Triphenylammonium Tricyanomethanide as an Efficient and Recyclable Nanostructured Molten-Salt Catalyst for the Synthesis of N-Benzylidene-2-arylimidazo[1,2-a] pyridin-3-amines**

Bagheri, S., Zolfigol, M. A., Schirhagl, R. & Hasani, M., Jun-2017, In: *Synlett*. 28, 10, p. 1173-1176 4 p.

### **Shape and crystallographic orientation of nanodiamonds for quantum sensing**

Ong, S. Y., Chipaux, M., Nagl, A. & Schirhagl, R., 7-May-2017, In: *PCCP : Physical Chemistry Chemical Physics*. 19, 17, p. 10748-10752 5 p.

### **Nanodiamonds as multi-purpose labels for microscopy**

Hemelaar, S. R., de Boer, P., Chipaux, M., Zuidema, W., Hamoh, T., Martinez, F. P., Nagl, A., Hoogenboom, J. P., Giepmans, B. N. G. & Schirhagl, R., 7-Apr-2017, In: *Scientific Reports*. 7, 1, 9 p., 720.

#### **The interaction of fluorescent nanodiamond probes with cellular media**

Hemelaar, S. R., Nagl, A., Bigot, F., Rodriguez Garcia, M., de Vries, M. P., Chipaux, M. & Schirhagl, R., Apr-2017, In: *Microchimica Acta*. 184, 4, p. 1001-1009 9 p.

#### **Transferring the Selectivity of a Natural Antibody into a Molecularly Imprinted Polymer**

Schirhagl, R., 3-Mar-2017, In: *Methods in Molecular Biology*. 1575, p. 325-340 16 p.

#### **Gravimetric Viral Diagnostics: QCM Based Biosensors for Early Detection of Viruses**

Afzal, A., Mujahid, A., Schirhagl, R., Bajwa, S. Z., Latif, U. & Feroz, S., 13-Feb-2017, In: *Chemosensors*. 5, 1, p. 1-25 25 p.

#### **Viruses, Artificial Viruses and Virus-Based Structures for Biomedical Applications**

van Rijn, P. & Schirhagl, R., 22-Jun-2016, In: *Advanced healthcare materials*. 5, 12, p. 1386-1400 15 p.

#### **Switchable, self-assembled CdS nanomaterials embedded in liquid crystal cell for high performance static memory device**

Pal, K., Yang, X., Mohan, M. L. N. M., Schirhagl, R. & Wang, G., 15-Apr-2016, In: *Materials Letters*. 169, p. 37-41 5 p.

#### **Applications of Molecularly Imprinted Polymer Nanoparticles and Their Advances toward Industrial Use: A Review**

Wackerlig, J. & Schirhagl, R., 5-Jan-2016, In: *Analytical Chemistry*. 88, 1, p. 250-261 12 p.

#### **Optical and Electrical Investigation of ZnO Nano-Wire Array to Micro-Flower from Hierarchical Nano-Rose Structures**

Pal, K., Zhan, B., Ma, X., Wang, G., Schirhagl, R. & Murgasen, P., Jan-2016, In: *Journal of Nanoscience and Nanotechnology*. 16, 1, p. 400-409 10 p.

#### **Bioinspired surfaces and materials**

Schirhagl, R., Weder, C., Lei, J., Werner, C. & Textor, H. M., 2016, In: *Chemical Society Reviews*. 45, 2, p. 234-236 3 p.

#### **Bioinspired Surfaces and Materials**

Schirhagl, R., Weder, C., Lei, J., Werner, C. & Textor, H. M., 2016, In: *Chemical Society Reviews*. 45, p. 234-236

#### **Bioinspired Surfaces and Materials**

Schirhagl, R. (Editor), Weder, C. (Editor), Weder, C. (Editor), Lei, J. (Editor) & Textor, H. M. (Editor), 2016, In: *Chemical Society Reviews*. 45, 2 (special issue)

#### **Influence of ZnO nanostructures in liquid crystal interfaces for bistable switching applications**

Pal, K., Zhan, B., Mohan, M. L. N. M., Schirhagl, R. & Wang, G., 1-Dec-2015, In: *Applied Surface Science*. 357, B, p. 1499-1510 12 p.

#### **Nanometer-scale isotope analysis of bulk diamond by atom probe tomography**

Schirhagl, R., Raatz, N., Meijer, J., Markham, M., Gerstl, S. S. A. & Degen, C. L., Nov-2015, In: *Diamond and Related Materials*. 60, p. 60-65 6 p.

#### **Improving surface and defect center chemistry of fluorescent nanodiamonds for imaging purposes-a review**

Nagl, A., Hemelaar, S. R. & Schirhagl, R., Oct-2015, In: *Analytical and Bioanalytical Chemistry*. 407, 25, p. 7521-7536 16 p.

#### **Bioapplications of Molecularly Imprinted Polymers**

Schirhagl, R., 2014, In: *Analytical Chemistry*. p. 250-261 12 p.

#### **Investigation of Surface Magnetic Noise by Shallow Spins in Diamond**

Roskopf, T., Dussaux, A., Ohashi, K., Loretz, M., Schirhagl, R., Watanabe, H., Shikata, S., Itoh, K. & Degen, C., 2014, In: *Physical Review Letters*. 112, 14, p. 147602 5 p.

**Nitrogen-Vacancy Centers in Diamond: Nanoscale Sensors for Physics and Biology**

Schirhagl, R., Chang, K., Loretz, M. & Degen, C. L., 2014, In: Annual Review of Physical Chemistry. 65, p. 83-105 23 p.

**Advanced vapor recognition materials for selective and fast responsive surface acoustic wave sensors: A review**

Afzal, A., Iqbal, N., Mujahid, A. & Schirhagl, R., 13-May-2013, In: Analytica Chimica Acta. 787, p. 36-49 14 p.

**Bioapplications for Molecularly Imprinted Polymers**

Schirhagl, R., 2013, In: Analytical Chemistry. 86, 1, p. 250-261 12 p.

**Devices and methods for separating particles**

Schirhagl, R. (Inventor), Zare, R. N. (Inventor), Ren, K. (Inventor) & Banaei, N. (Inventor), 2013, Patent No. US 20130309657 A1, Priority date 17-May-2012

**Efficient one-step novel synthesis of ZnO nanospikes to nanoflakes doped OAFLCs (W-182) host: Optical and dielectric response**

Pal, K., Pal Majumder, T., Schirhagl, R., Ghosh, S., Roy, S. K. & Dabrowski, R., 2013, In: Applied Surface Science. 280, p. 405-417 13 p.

**Temperature variation dielectric behavior of TiO<sub>2</sub> nanocabbages and doped W-182 (AFLC)**

Pal, K., Sankar Roy, J., Majumder, T. P., Ghosh, S., Kumar Roy, S., Schirhagl, R. & Dabrowski, R., 2013, In: Journal of Luminescence. 136, p. 278-284 7 p.

**Immunosensing with artificial antibodies in organic solvents or complex matrices**

Schirhagl, R., Qian, J. & Dickert, F. L., 2012, In: Sensors and Actuators B: Chemical. 173, p. 585-590 6 p.

**Microfluidic capture and release of bacteria in a conical nanopore array**

Guo, P., Hall, E. W., Schirhagl, R., Mukaibo, H., Martin, C. R. & Zare, R. N., 2012, In: Lab on a Chip - Miniaturisation for Chemistry and Biology. 12, 3, p. 558-561 4 p.

**Natural and biomimetic materials for the detection of insulin**

Schirhagl, R., Latif, U., Podlipna, D., Blumenstock, H. & Dickert, F. L., 2012, In: Analytical Chemistry. 84, 9, p. 3908-3913 6 p.

**Separation of bacteria with imprinted polymeric films**

Schirhagl, R., Hall, E. W., Fuereder, I. & Zare, R. N., 2012, In: Analyst. 137, 6, p. 1495-1499 5 p.

**Spin properties of very shallow nitrogen vacancy defects in diamond**

Ofori-Okai, B., Pezzagna, S., Chang, K., Loretz, M., Schirhagl, R., Tao, Y., Moores, B., Groot-Berning, K., Meijer, J. & Degen, C., 2012, In: Physical Review B. 86, 8, p. 081406

**Surface-imprinted polymers in microfluidic devices**

Schirhagl, R., Ren, K. & Zare, R. N., 2012, In: Science china-Chemistry. 55, 4, p. 469-483 15 p.

**Atrazine detection based on antibody replicas**

Schirhagl, R., Latif, U. & Dickert, F. L., 2011, In: Journal of Materials Chemistry. 21, 38, p. 14594-14598 5 p.

**Glucose-driven fuel cell constructed from enzymes and filter paper**

Ge, J., Schirhagl, R. & Zare, R. N., 2011, In: Journal of Chemical Education. 88, 9, p. 1283-1286 4 p.

**Microfluidic purification and analysis of hematopoietic stem cells from bone marrow**

Schirhagl, R., Fuereder, I., Hall, E. W., Medeiros, B. C. & Zare, R. N., 2011, In: Lab on a Chip - Miniaturisation for Chemistry and Biology. 11, 18, p. 3130-3135 6 p.

Particle sorting using a porous membrane in a microfluidic device

Wei, H., Chueh, B.-H., Wu, H., Hall, E. W., Li, C.-W., Schirhagl, R., Lin, J.-M. & Zare, R. N., 2011, In: *Lab on a Chip - Miniaturisation for Chemistry and Biology*. 11, 2, p. 238-245 8 p.

**Biorekognition mit strukturierten Oberflächen--Sensoranwendungen zur Insulin-und Allergendetektion**

Dickert, F., Lieberzeit, P., Schirhagl, R., Aigner, S., Sontimuang, C., Suedee, R. & Blumenstock, H., 2010, In: *Sensoren und Messsysteme*.

**Chemosensors for viruses based on artificial immunoglobulin copies**

Schirhagl, R., Lieberzeit, P. A. & Dickert, F. L., 2010, In: *Advanced materials*. 22, 18, p. 2078-2081 4 p.

Comparing biomimetic and biological receptors for insulin sensing

Schirhagl, R., Podlipna, D., Lieberzeit, P. A. & Dickert, F. L., 2010, In: *Chemical Communications*. 46, 18, p. 3128-3130 3 p.

Sensors for Healthcare Monitoring-Proteins, Viruses and Blood-Group-Typing

Dickert, F., Lieberzeit, P., Seifner, A., Schirhagl, R. & Jungbauer, C., 2010, *World Congress on Medical Physics and Biomedical Engineering, September 7-12, 2009, Munich, Germany*. Dossel, O. & Schlegel, W. C. (eds.). Springer, Vol. 25/8. p. 325-328 4 p.

**A1. 2-Replicae of Antibodies-Robust Mass-Sensitive Sensors for Allergens and Other Bioanalytes**

Dickert, F. L., Schirhagl, R., Lieberzeit, P., Hussain, T. & Cichna-Markl, M., 2009, In: *Proceedings SENSOR*. p. 29-33 5 p.

Detection of viruses with molecularly imprinted polymers integrated on a microfluidic biochip using contact-less dielectric microsensors

Birnbaumer, G. M., Lieberzeit, P. A., Richter, L., Schirhagl, R., Milnera, M., Dickert, F. L., Bailey, A. & Ertl, P., 2009, In: *Lab on a Chip*. 9, 24, p. 3549-3556 8 p.

Sensing picornaviruses using molecular imprinting techniques on a quartz crystal microbalance

Jenik, M., Schirhagl, R., Schirk, C., Hayden, O., Lieberzeit, P., Blaas, D., Paul, G. & Dickert, F. L., 2009, In: *Analytical Chemistry*. 81, 13, p. 5320-5326 7 p.