



Trends in Micro Nano

Innovative Methode zur Detektion und Analyse von Nanopartikeln in komplexer Umgebung

30.11.2017

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adolphe merkle institute
excellence in pure and applied nanoscience



Nanopartikel



Gold Nanopartikel
in Kosmetikprodukten



Antibakterielle Silber
Nanopartikel



Titan- und Siliziumdioxid
Nanopartikel in Lebensmitteln



Silber und Zinkoxid
Nanopartikel in
Verpackungsmaterial



Titandioxid Nanopartikel
in Sonnencreme



Nanopartikel für
Diagnostik und Therapie

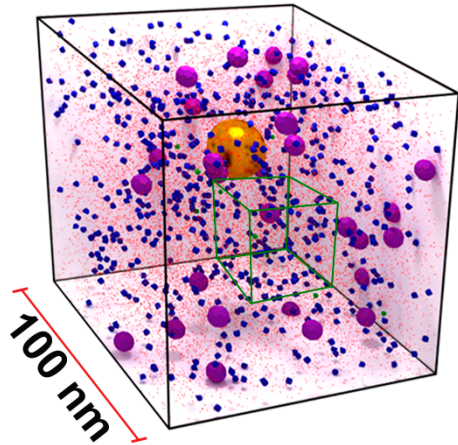
Partikel in Zellkulturmedium mit 10% Serum

Würfel mit 100 nm Seitenlänge

Enthält einen 40nm NP ($20 \mu\text{g/ml}$)

Das Umfeld enthält ca.:

- 6400 Aminosäuren,
- 100 Vitamine und Moleküle
- 240'000 Ionen
- 34 Proteine



Moore et al. Chem. Soc. Rev. 2015

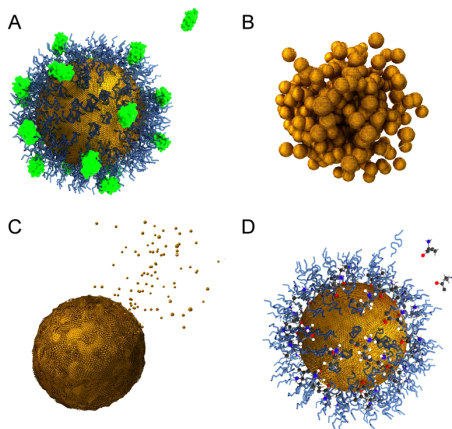
Was kann mit den Partikeln passieren?

A: Proteine interagieren mit Partikeln

B: Partikel aggregieren

C: Partikel lösen sich auf

D: Die Partikelhülle löst sich

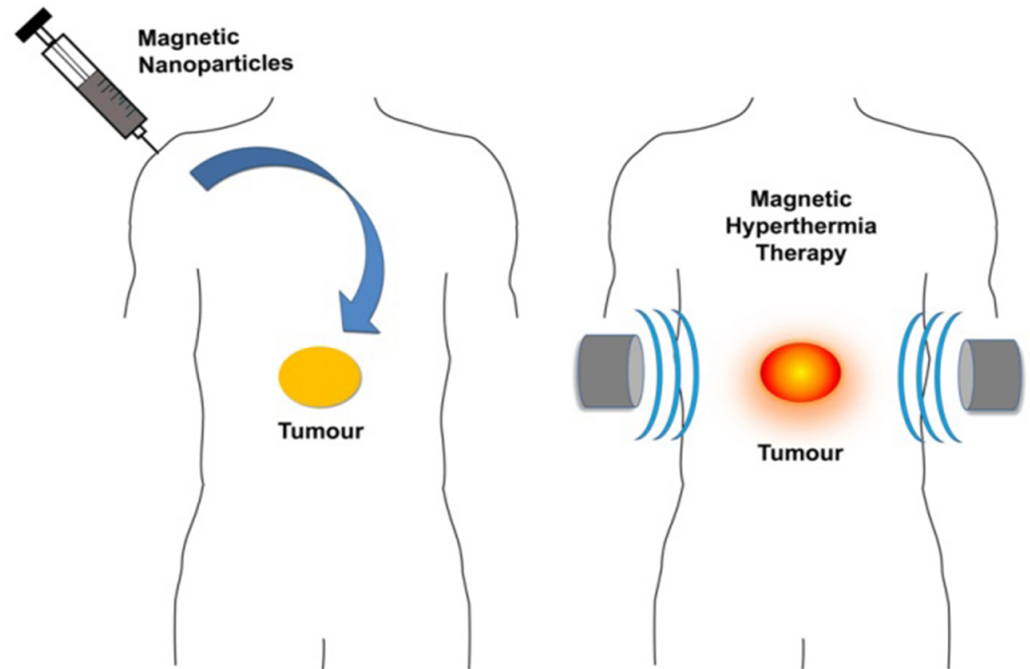
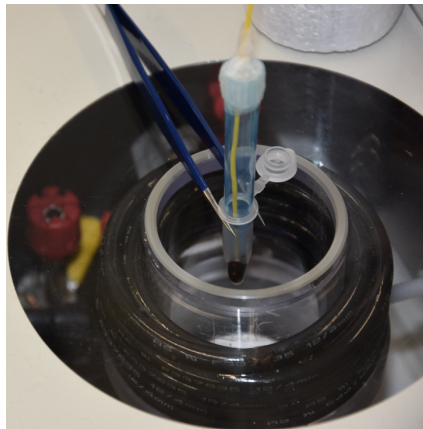
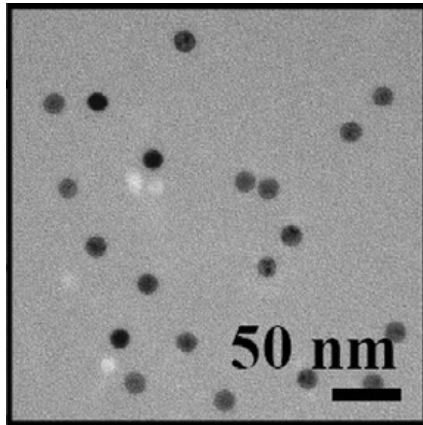


Urban et al. Colloids and Surfaces B: Biointerfaces 2015



Magnetische Hyperthermie

Superparamagnetische Eisenoxid Nanopartikel (SPIONs)



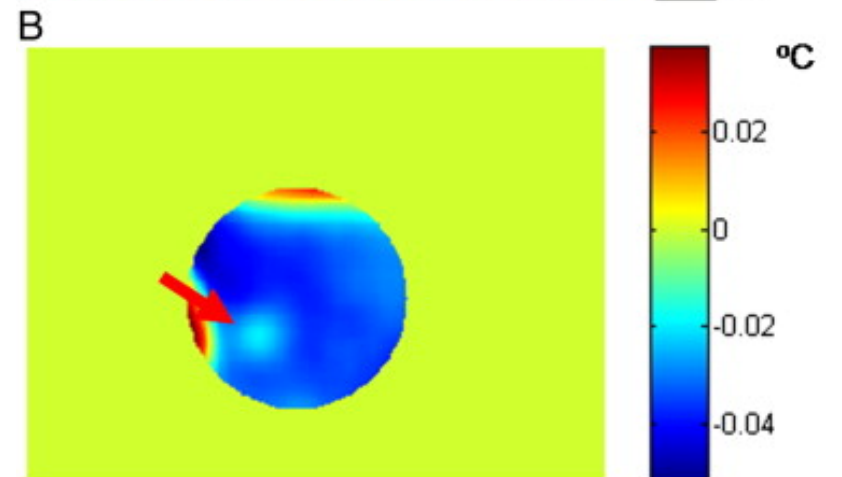
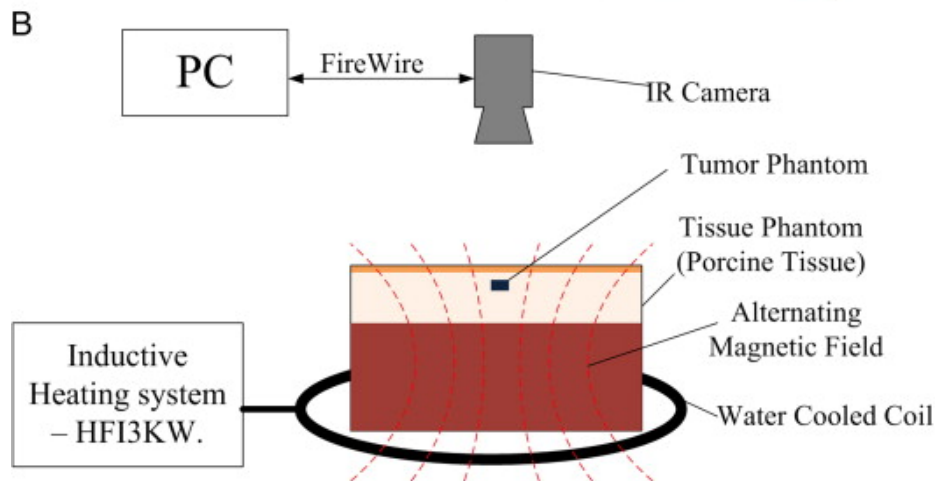
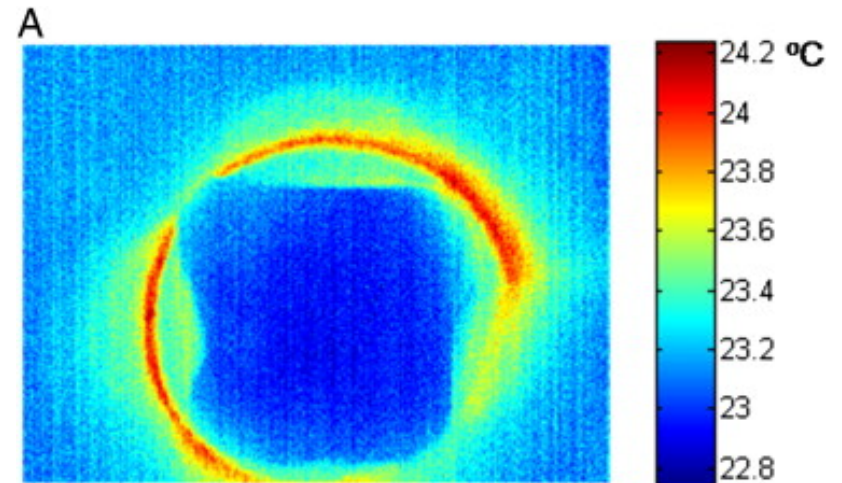
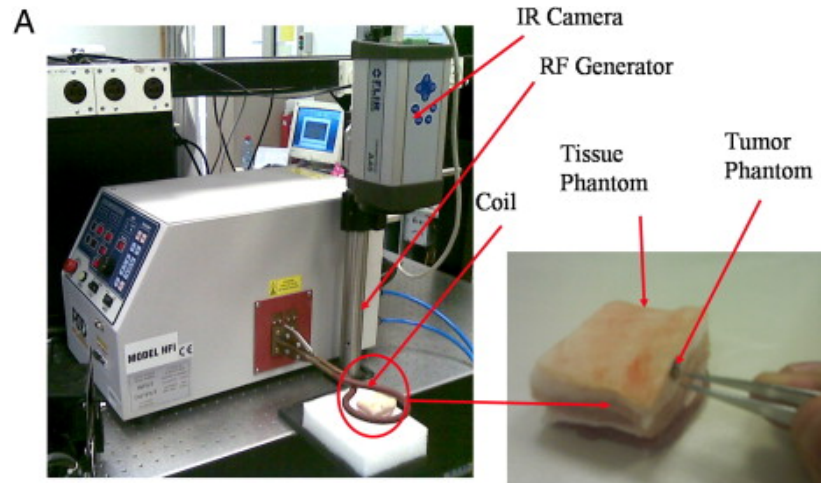
<http://technologytimes.pk/post.php?title=Magnetic+hyperthermia>

magforce®

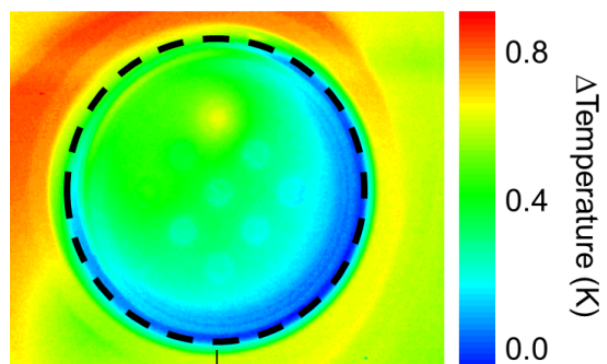
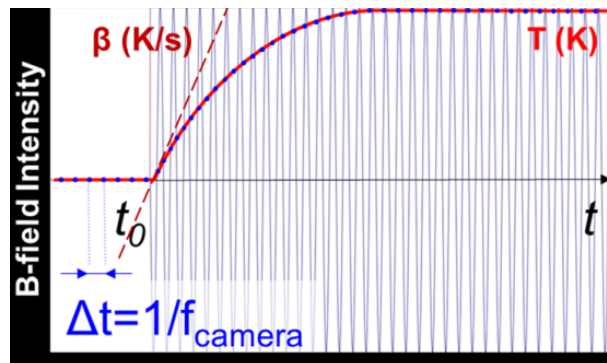
THE NANOMEDICINE COMPANY



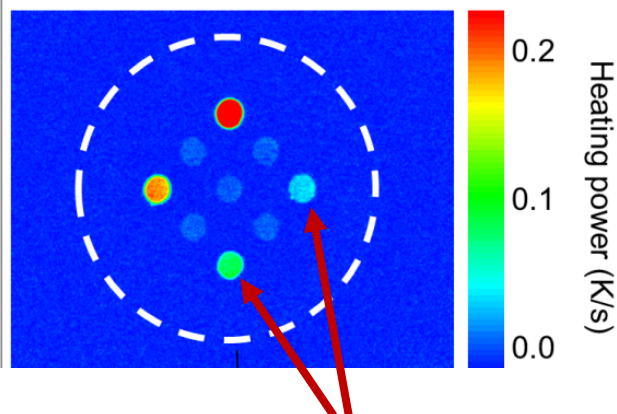
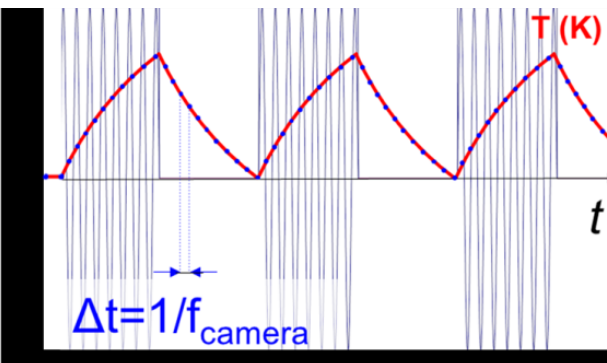
Infrarot Thermographie



Infrarot



Lock-in



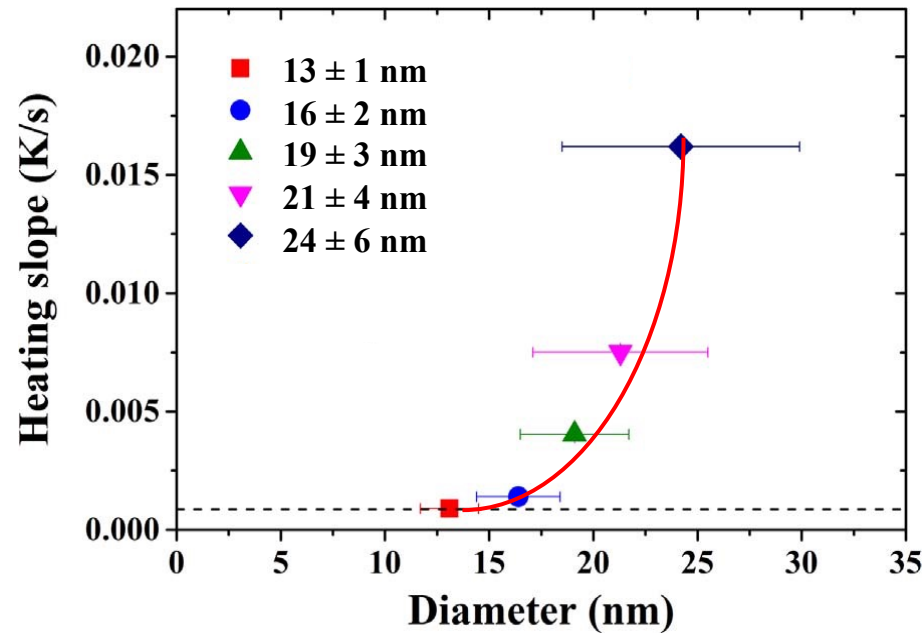
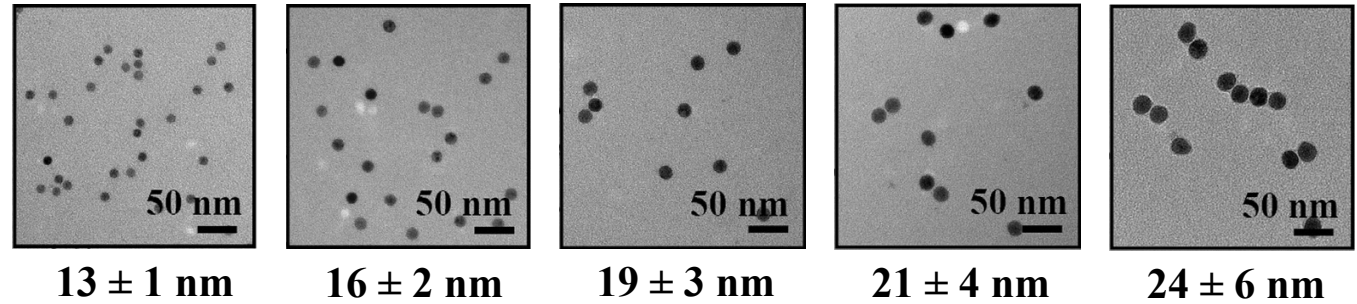
Nanopartikel Dispersion

U.S. Patent Application No. 62,331,017

Monnier, C et al. (2016). *Nanoscale*, 8, 27

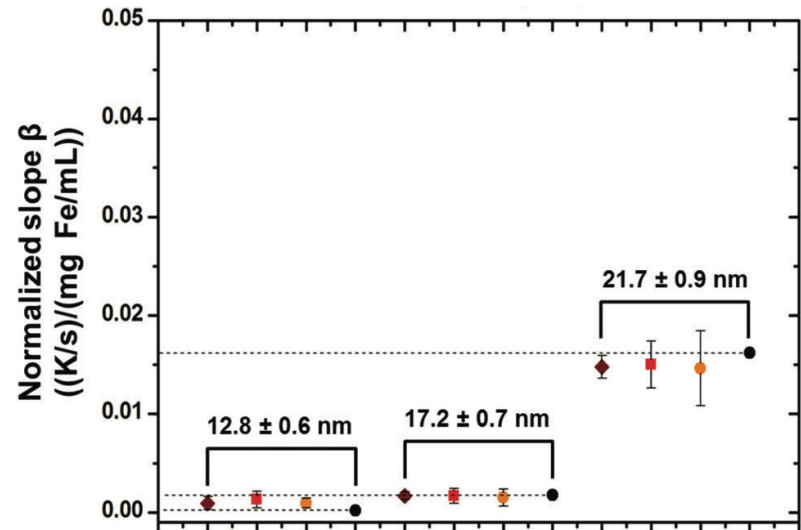
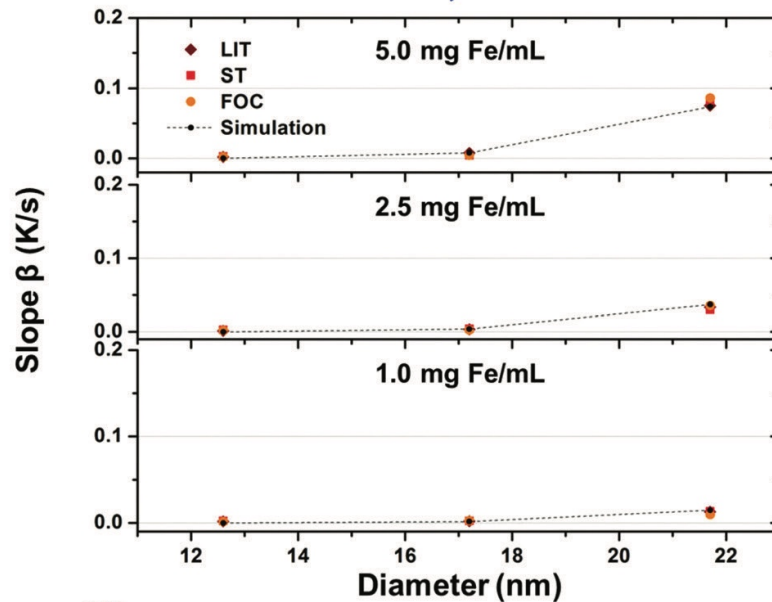
Monnier C, Crippa F et al. *J. Phys. Chem. C*, Just Accepted Manuscript

Größen- abhängigkeit

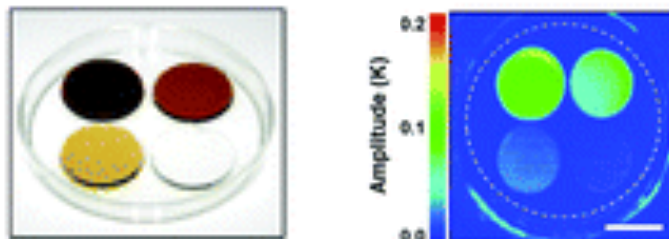


Validierung

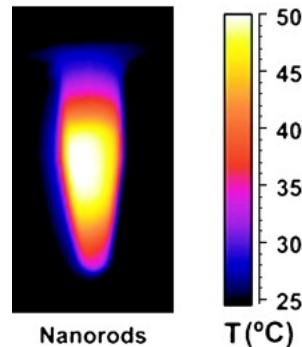
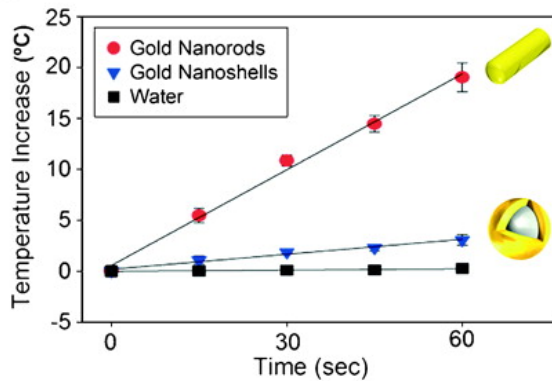
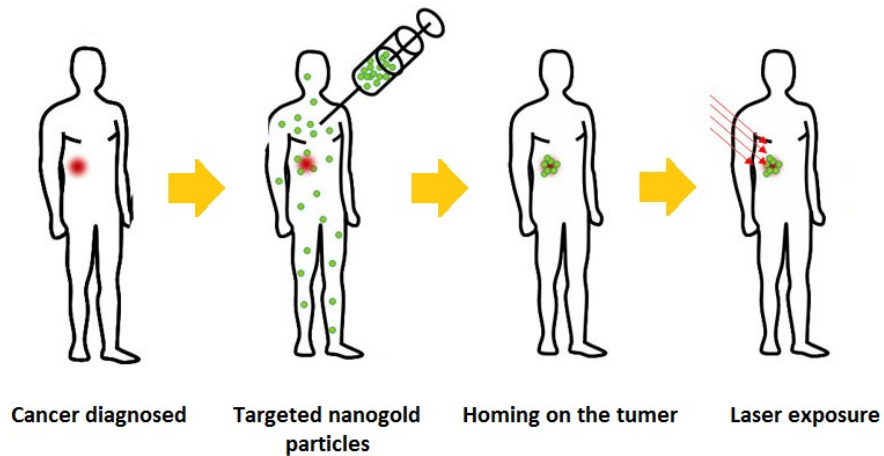
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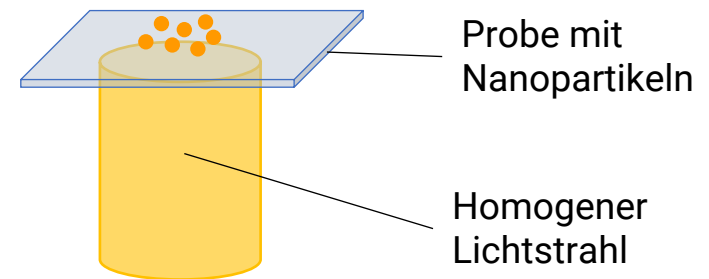
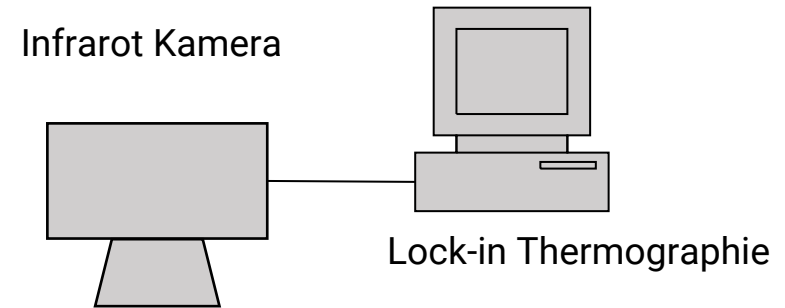
Im festen Zustand



Metallische Nanopartikel

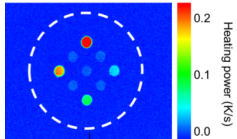


Lock-in Thermographie



U.S. Patent Application No. 62/512,300

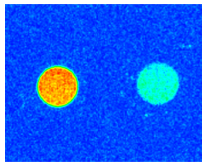
- <https://ninithi.wordpress.com/2015/07/23/a-new-nanogold-based-cancer-treatment-burns-cancer-cells-from-within/>
- G. von Maltzahn; Cancer Res May 1 2009 (69) (9) 3892-3900.



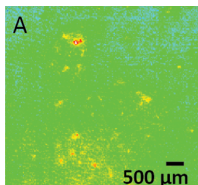
- Lock-in Thermographie zur Analyse von Nanopartikeln



- Analyse in Flüssigkeit oder im Feststoff



- Analyse von Nanopartikeleigenschaften (Aggregation, Auflösung)



- Analyse in Zellen oder Gewebe



Acknowledgments



BioNanomaterials Group

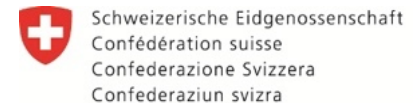
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