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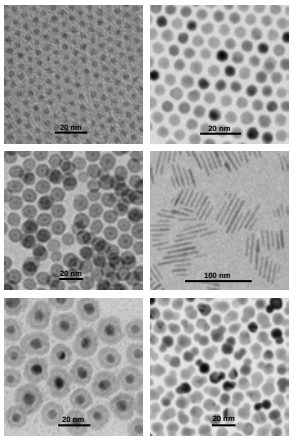
- Ph.D. - University of Hamburg, Germany, **2003**

- Understaning the mechanism of nucleation and growth of nanomaterials.
- Self-assembly of nanoparticles.
- In-situ techniques to vizualize the synthesis and study of structure-property correlation at nanoscale.
- Nanomaterials for application in batteries and catalysis.

Selected publications from a total of 60+

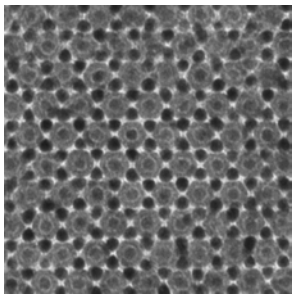


Synthesis of nanomaterials

1. Galyna Krylova, Lisandro J. Giovanetti, Felix G Requejo, Nada M. Dimitrijevic, Alesia Prakapenka, and Elena V. Shevchenko. Study of Nucleation and Growth Mechanism of the Metallic Nanodumbbells. J. Am. Chem. Soc. 2012, 134, 4384-4392.

2. E.V. Shevchenko, M.I. Bodnarchuk, M.V. Kovalenko, D.V. Talapin, R.K. Smith, S. Aloni, W. Heiss, A.P. Alivisatos. Gold (Core) – Iron Oxide (Hollow Shell) Nanoparticles. Adv. Mater. 2008, 20, 4323-4329.

3. E. Shevchenko, D. Talapin, H. Schablegger, A. Kornowski, H.Weller. Study of Nucleation and Growth in the "hot" organometallic synthesis of magnetic alloy nanocrystals: the role of nucleation rate in size tuning of $CoPt_3$ nanocrystals. J. Am. Chem. Soc. 2003, 125, 9090-9101.



Self-assembly of nanoparticles

4. Maryna I. Bodnarchuk, Elena V. Shevchenko, and Dmitri V. Talapin. Structural Defects in Periodic and Quasicrystalline Binary Nanocrystal Superlattices. J. Am. Chem. Soc., 2011, 133 (51), 20837–20849.

5. P. Podsiadlo, B. Lee, V.B. Prakapenka, G.V. Krylova, R.D. Schaller, A. Demortiere, E.V. Shevchenko. High-pressure stability and elasticity of supercrystals self-assembled from nanocrystals. Nano Lett. 2011, 11, 579-588.

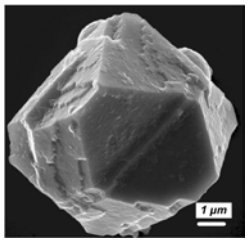
6. B. Lee, P. Podsiadlo, S. Rupich, D.V. Talapin, T. Rajh, E.V. Shevchenko. Comparison of structural behavior of nanocrystals in randomly packed films and long-range ordered superlattices by time-resolved small angle X-Ray scattering. J. Am. Chem. Soc. 2009, 131, 16386–16388

7. D.V. Talapin,* E.V. Shevchenko,*M.I. Bodnarchuk, J. Chen, X. Ye, C.B. Murray. Qasicrystalline order in self-assembled binary nanoparticle superlattices. Nature, 2009, 461, 892-893. (*equal contribution).

8. E.V. Shevchenko, M. Ringler, A. Schwemer, D.V. Talapin, T.A. Klar, A.L. Rogach, J. Feldmann, A.P. Alivisatos. Self-Assembled Binary Superlattices of CdSe and Au Nanocrystals and Their Fluorescence Properties. J. Am. Chem. Soc. 2008, 130, 3274-3275.

9. E.V.Shevchenko, J.B. Kortright, D.V. Talapin, S. Aloni S, A.P. Alivisatos. Quasi-Ternary Nanoparticle Superlattices through nanoparticle design. Adv. Mater. 2007 19, 4183-4188.

10. E.V. Shevchenko, D.V. Talapin, C.B. Murray, S. O'Brien. Structural Characterization of Self-Assembled Multifunctional Binary Nanoparticle Superlattices. J. Am. Chem. Soc. 2006, 128, 3620-3637.

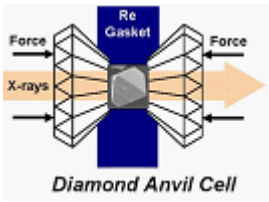


11. E. V. Shevchenko, D. V. Talapin, N. A. Kotov, S. O'Brien, C. B. Murray. Structural Diversity in Binary Nanoparticle Superlattices. Nature 2006, 439, 55-59.

12. D. Talapin, E. Shevchenko, A. Kornowski, S. Foerster and H. Weller. CdSe and CdSe/CdS Nanorod Solids. J. Am. Chem. Soc. 2004, 126, 12984-12988.

13. E. Shevchenko, D. Talapin, A. Kornowski, F. Wiekhorst, J. Kötzler, M. Haase, A. Rogach, H. Weller. Colloidal Crystals of Monodisperse FePt Nanoparticles Grown by a Three-Layer Technique of Controlled Oversaturation. Adv. Mater. 2002, 14, 287-289.

Mechanical properties of nanoparticles and their self-assembled structures

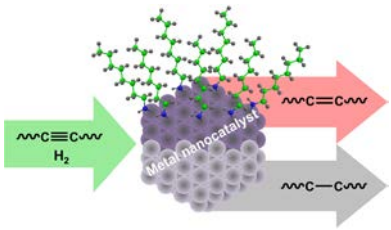


14. Podsiadlo, P.; Kwon, S.G.; Koo, B.; Lee, B.; Prakapenka, V.B.; Dera, P.; Zhuravlev, K.K.; Krylova, G.; Shevchenko, E.V. How "hollow" are hollow nanoparticles? J. Am. Chem. Soc. 2013, 135, 2435-2438.

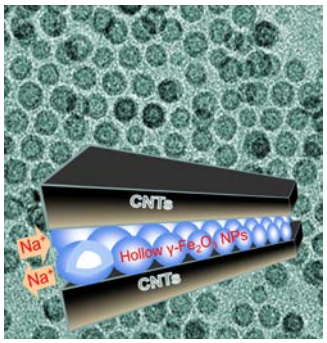
15. P. Podsiadlo, B. Lee, V.B. Prakapenka, G.V. Krylova, R.D. Schaller, A. Demortiere, E.V. Shevchenko. High-pressure stability and elasticity of supercrystals self-assembled from nanocrystals. Nano Lett. 2011, 11, 579-588.

16. P. Podsiadlo, G. Krylova, B. Lee, K. Critchley, D. J. Gosztola, D. V. Talapin, P. D. Ashby, E. V. Shevchenko. The Role of Order, Nanocrystal Size and Capping Ligands in the Collective Mechanical Response of Three-Dimensional Nanocrystal Solids. J. Am. Chem. Soc. 2010, 132, 8953-8960.

Nanomaterials for application in batteries and catalysis



17. Soon Gu Kwon, Galyna Krylova, Aslihan Sumer, Michael M. Schwartz, Emilio E. Bunel, Christopher L. Marshall, Soma Chattopadhyay, Byeongdu Lee, Julius Jellinek, and Elena V. Shevchenko. Capping Ligands as Selectivity Switchers in Hydrogenation Reactions. Nano Lett., 2, 5382–5388.



18. Bonil Koo, Hui Xiong, Michael D. Slater, Vitali B. Prakapenka, Mahalingam Balasubramanian, Paul Podsiadlo, Christopher S. Johnson, Tijana Rajh, and Elena V. Shevchenko. Hollow Iron Oxide Nanoparticles for Application in Lithium Ion Batteries. Nano Lett., 2012, 12, 2429–2435.

19. Bonil Koo, Soma Chattopadhyay, Tomohiro Shibata, Vitali B. Prakapenka, Christopher S. Johnson, Tijana Rajh, and Elena V. Shevchenko. Intercalation of Sodium Ions into Hollow Iron Oxide Nanoparticles. Chem. Mater., 2013, 25, 245–252.

Review articles

20. D.V. Talapin, J.-S.. Lee, M. Kovalenko, E.V. Shevchenko. Prospects of colloidal nanoscrystals for electronic and optoelectronic applications. Chem. Rev. 2010, 110, 389-458.

21. A.L. Rogach, D.V. Talapin, E.V. Shevchenko, A. Kornowski, H. Weller. Organisation of Matter on Different Size Scales: Monodisperse Nanocrystals and their Superstructures. Adv. Func. Mater. 2002, 12, 653-664.