17. ÖSTERREICHISCHE CHEMIETAGE

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UNIVERSITY OF SALZBURG

Program

UNIVERSITÄT SALZBURG

SCS
Swiss Chemical Society

HS 403	**Inorganic Chemistry II**	
	11:00 **OP-16**	**B.G. Steller** DIARYLTIN DIHYDRIDES AS BUILDING BLOCKS FOR FUNCTIONALIZED OLIGOMERS AND σ-CONJUGATED MATERIALS
	11:20 **OP-17**	**Ch.A. Riedl** *C,N*-CYCLOMETALATED RUTHENA(II)- AND OSMA(II)CYCLES AS ANTICANCER AGENTS
	11:40 **OP-18**	**W. Viertl** PREPARATION OF NEW DI-, TRI-, TETRA- AND HEXADENTATE AMINOPHOSPHANES FOR ARTIFICIAL PHOTOSYNTHESIS
HS 403	**Nanomaterials**	
	13:00 **OP-45**	**M. Yarema** QUANTIFYING THE ATOMISTIC AND NANOSCALE STRUCTURE OF GRADED CORE/SHELL COLLOIDAL NANOCRYSTALS: THE CASE OF Ag-In-Se/ZnSe
	13:20 **OP-46**	**S. Gross** EXPLORING THE SYNERGY OF MINIEMULSION AND SOLVOTHERMAL CONDITIONS FOR THE LOW TEMPERATURE CRYSTALLIZATION OF MAGNETIC LATE TRANSITION METAL FERRITE COLLOIDS
	13:40 **OP-47**	**S. Barth** LOW TEMPERATURE SYNTHESIS OF GERMANIUM NANORODS AND NANOWIRES

Low Temperature Synthesis of Germanium Nanorods and Nanowires

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Semiconductor nanowires are very promising building blocks for devices and at the same time ideal model systems to study materials properties [1]. Germanium nanowires and nanorods have a broad spectrum of potential applications including electronic and optoelectronic devices, lithium ion batteries, sensors *etc*. The synthesis of these anisotropic nanostructures usually requires temperatures >300 °C hampering the growth on temperature-sensitive materials such as polymers.

We present in this contribution the growth of highly crystalline Ge nanowires and nanorods at temperatures as low as 170 °C. These structures grow either via the solution-liquid-solid (SLS) or the vapor-liquid-solid (VLS) mechanism depending on the growth conditions. In addition, we can show that the slow growth of these structures at low temperatures is due to the precursor decomposition characteristics as a limiting factor. Moreover, the decomposition of the Ge precursor is catalyzed by the presence of Ga seeds since no decomposition products are obtained in their absence. Ge nanowires have been characterized by different analytical methods including TEM, EDX as well as XRD and the incorporation of unusually high Ga contents of up to 3% in the Ge structures has been observed. Such unusually high catalyst incorporation in group IV nanowires has been observed for other semiconductor/metal combinations [3] and helped targeting metastable compositions [4]. Therefore, electrical characterization of individual Ge nanowires has been performed in order to quantify the impact of the Ga incorporation on their conductivity. According to the phase diagram, Ga has excellent potential for the Ge nanowire formation at even lower temperatures using suitable Ge precursors, which will be targeted in future studies.

[1] S. Barth, F. Hernandez-Ramirez, et.al. *Prog. Mater. Sci.* 2010, *55*, 563.

[2] O. Moutanabbir, D. Insheim, et.al. *Nature* 2013, *496*, 78.

[3] M. S. Seifner, F. Biegger, A. Lugstein, J. Bernardi, S. Barth *Chem. Mater.* 2015, *27*, 6125.