Manfred Scheer

M. Scheer

Date of birth:	June 26, 1955
Position:	Professor and Chair of Inorganic Chemistry, University of Regensburg (Germany)
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Education:	1975–1980 Study of chemistry (Diplom) at the University of Halle-Wittenberg (Germany) 1983 PhD with Prof. A. Tzschach and Prof. K. Jurkschat 1985–1986 Postdoc with Prof. V. E. Fedorov, Institute of Inorganic Chemistry, Russian Academy of Sciences, Novosibirsk (Russia) 1990/1991: Postdoc with Prof. G. Wilke, Max Planck Institute for Coal Research Mülheim an der Ruhr (Germany)
Awards:	**1992** Feodor Lynen Fellowship of the Alexander von Humboldt Foundation; **1993** Heisenberg Fellowship of the German Research Foundation; **1998** Albright & Wilson Lecturer, Bristol University (UK); since **2005** "Concurrent Professor", Nanjing University (PR China); since **2007** Visiting Professor, Anhui University of Technology, Ma'anshan, (PR China); **2010** Esther and Bingham J. Humphrey Memorial Lecturer, The University of Vermont (USA)
Current research interests:	Unsubstituted main-group elements as ligands; supramolecular chemistry of polypnicogen complexes; mixed main-group-element compounds; highly reactive compounds with element–transition-metal multiple bonds; molecular precursors for metastable solids, nanoparticles, and materials.
Hobbies:	Biking, mountain hiking, history of art

The author presented on this page has published more than ***25 articles*** *since 2000 in Angewandte Chemie, most recently:*
"A Stable Cation of a CSi$_3$P Five-Membered Ring with a Weakly Coordinating Chloride Anion": S. S. Sen, J. Hey, M. Eckhardt, R. Herbst-Irmer, E. Maedl, R. A. Mata, H. W. Roesky, M. Scheer, D. Stalke, *Angew. Chem.* **2011**, *123*, 12718–12721; *Angew. Chem. Int. Ed.* **2011**, *50*, 12510–12513.

If I could be anyone for a day, I would be … Leonardo da Vinci.

My favorite way to spend a holiday is … to hike on an alpine "via ferrata".

When I was eighteen I wanted to be … a mathematician or a chemist. When becoming a mathematician, I could not imagine making a professional career, so I finally studied chemistry.

I am waiting for the day when someone will discover … complexes with a terminal bismuth ligand.

The biggest challenge facing scientists is … to solve energy and mobility problems.

Chemistry is fun because … it is an experimental science that creates unprecedented things that never existed before.

My favorite drink is … a glass of good white wine.

The most significant historic event of the past 100 years was … the unification of Germany.

In a spare hour, I … take my racing bike and cycle for 50 km.

My favorite musician is … Herbert Grönemeyer.

My favorite time of day is … the afternoon after 5 pm when it gets quiet in my office.

The secret of being a successful scientist is … a thirst for knowledge, persistency, and always critical analysis.

My favorite book is … "Die Vermessung der Welt" by Daniel Kehlmann.

Young people should study chemistry because … they should experience the fascination of a very living experimental science.

My favorite molecule is … our nanoballs.

My science "heroes" are … Marie Curie and Karl Ziegler.

My favorite author (science) is … Nils Wiberg (Holleman/Wiberg).

My favorite painter is … Vincent van Gogh.

The natural talent I would like to be gifted with … the ability to play a musical instrument.

My motto is … "It's a question of time until we will have/make it".

Has your approach to publishing your results changed since the start of your career?

Firstly, the conversion of the publication language from German to English has to be mentioned. For a non-native English speaker, it is not possible to point out subtleties and nuances. On the other hand, I have observed that—in my opinion very important—publications on the transformation pathway of P_4 in the coordination sphere of transition metals have been cited relatively seldom because they were published in *Chem. Ber.* in German, thus supporting the change to English as publication language. Moreover, my publication style has strongly changed. While reading the drafts of my publications, I try to put myself in the position of a possible referee. Thus, it is possible for me to consider open questions already in the to-be-submitted version, for example, control experiments and additional spectroscopic analyses. Furthermore, I set much value on a clearly formulated introduction, in which the novelty and the novel characteristics of the publication are explicitly pointed out. It is key to submit the manuscript to the appropriate journal.

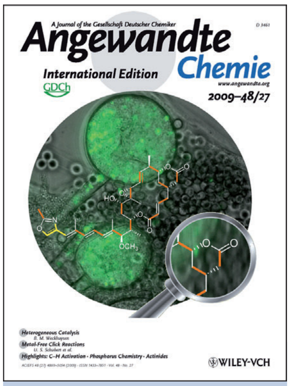
What do you think the future holds for your field of research?

Our research is mainly oriented towards fundamental research. From our three large research fields (polyelement compounds with a focus on Group 15 elements; mixed polyelement compounds with a focus on Group 13/15 complexes, and supramolecular chemistry with a focus on spherical fullerene-like compounds), the field of Group 13/15 compounds with regard to purely inorganic-based oligomers and polymers belongs to those that will possibly find an application. On one hand, we will be able to prepare completely novel polymers and oligomers of pentelyltrielanes without any organic moieties, and on the other hand, we can induce a defined tacticity into the polymers by implementation of suitable organic substituents. Moreover, I am convinced that we will achieve carbon-free fullerene chemistry (exclusively regarding the skeleton atoms) with the help of the nanoballs formed by the system $[Cp^RFe(\eta^5\text{-}P_5)]/Cu^I$ halogenide. Furthermore, phosphorus is more flexibile than carbon. So, formation of pores and transformation processes will become possible and lead to defined functionalities.

My 5 top papers:

1. “Is It Possible to Stabilise Complexes with a Tungsten Phosphorus Triple Bond?”: M. Scheer, K. Schuster, T. A. Budzichowski, M. H. Chisholm, W. E. Streib, *Chem. Commun.* **1995**, 1671–1672.
   The synthesis and complete spectroscopic characterization of the first complexes with transition-metal–phosphorus triple bonds stabilized by Lewis acidic $M(CO)_5$ ($M = Cr$, W) fragments are described. Only four years later, we succeeded in obtaining X-ray crystal structures of these extremely small single crystals.
2. “Lewis Acid/Base Stabilized Phosphanylalane and -galane”: U. Vogel, A. Y. Timoshkin, M. Scheer, *Angew. Chem.* **2001**, *113*, 4541–4544; *Angew. Chem. Int. Ed.* **2001**, *40*, 4409–4412.
   Parent compounds (substituted only with hydrogen atoms) of the pentelyltrielanes (Group 13/15 compounds) were nonexistent and could not even be isolated or characterized in a noble-gas matrix. Only quantum chemical calculations existed on these systems. By using the “trick” of Lewis acid and Lewis base stabilization at the same time, we succeeded in accessing and structurally characterizing the first examples of this new class of substances. In retrospect, it is astonishing that we firstly synthesized the highly reactive phosphanylalanes and -gallanes, as the corresponding pentelylboranes are relatively tame.
3. “Synthesis of Inorganic Fullerene-Like Molecules”: J. Bai, A. V. Virovets, M. Scheer, *Science* **2003**, *300*, 781–783.
   In 2001, we had reported in *Angewandte Chemie* on the synthesis of 1D and 2D polymers starting from pentaphosphaferrocene $[Cp^*Fe(\eta^5\text{-}P_5)]$ ($Cp^* = C_5Me_5$) and Cu^I halogenides. On publication, I noticed that the reaction with CuCl led to the 1D polymer in only ca. 50% yield, while reactions with CuBr and CuI produced the 2D polymers nearly quantitatively. By analyzing the first reaction more precisely, we isolated crystals of the first nanoballs with a fullerene-like topology. It took us nearly one and a half years until we obtained single-crystal data that could be published. This was the access to a fascinating field.
4. “Stepwise Expansion of a Cp* Ring at Pentelidene Complexes and Stereoselective Formation of Triphosphines”: M. Scheer, C. Kuntz, M. Stubenhofer, M. Zabel, A. Y. Timoshkin, *Angew. Chem.* **2010**, *122*, 192–196; *Angew. Chem. Int. Ed.* **2010**, *49*, 188–192.
   Cp* is a frequently used ligand, particularly because it is chemically very inert. However, it can be hydrophosphinated when it is σ-bound to a strongly electrophilic phosphinidene P atom. We could characterize nearly all intermediates in the stereoselective formation of triphosphines by characterizing the isolated compounds by X-ray structure analysis. The two postulated partial reactions could be confirmed by DFT calculations.
5. “Access to Extended Polyphosphorus Frameworks”: F. Dielmann, M. Sierka, A. V. Virovets, M. Scheer, *Angew. Chem.* **2010**, *122*, 7012–7016; *Angew. Chem. Int. Ed.* **2010**, *49*, 6860–6864.
   Generally, P-rich polyphosphorus units could be synthesized only by cothermolysis of P_4 with transition-metal complexes, representing a more serendipitous access to such complexes. Here, we could show that strongly unsaturated transition-metal-complex fragments are able to consume P_4 units to build up neutral complexes containing the largest skeletons of P_{16} and P_{24} units reported to date.

DOI: 10.1002/anie.201107657



A Journal of the Gesellschaft Deutscher Chemiker

Angewandte Chemie

International Edition

2009–48/27

WILEY-VCH

The work of M. Scheer has been featured on the inside cover of *Angewandte Chemie*:
“A Spherical Molecule with a Carbon-Free I_h-C_{80} Topological Framework”: M. Scheer, A. Schindler, C. Gröger, A. V. Virovets, E. V. Peresypkina, *Angew. Chem.* **2009**, *121*, 5148–5151; *Angew. Chem. Int. Ed.* **2009**, *48*, 5046–5049.