M. Jansen

The author presented here has published more than ***30 articles*** *since 2000 in Angewandte Chemie, most recently:*
"A Universal Representation of the States of Chemical Matter Including Metastable Configurations in Phase Diagrams": M. Jansen, I. V. Pentin, J. C. Schön, *Angew. Chem.* **2012**, *124*, 136–139; *Angew. Chem. Int. Ed.* **2012**, *51*, 132–135.

Martin Jansen

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Position: Director at the Max Planck Institute for Solid State Research, Stuttgart (Germany)
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Education: 1966–1970 Undergraduate degree in chemistry, Giessen University (Germany)
1973 PhD with Rudolf Hoppe, Giessen University
1978 Habilitation/Venia Legendi in Inorganic Chemistry, Giessen University
Awards: **2004** Honorary Doctorate from the Ludwig-Maximilians-Universität Munich; **2007** Karl Ziegler Award; **2009** Prix binational franco-allemand Georg Wittig–Victor Grignard; Centenary Prize, Royal Society of Chemistry
Current research interests: Basic research in the field of preparative solid-state chemistry with the goal of developing modern materials, including oxides and nitrides of metals and nonmetals as well as fullerenes, e.g., new binary and ternary oxides, ionic conductors, structural oxide ceramics and pigments, amorphous inorganic nitridic covalent networks, or endohedral fullerenes and fullerides. A long-term goal is to increase the predictability of solid-state chemistry. Structure candidates are determined by studying the energy landscapes of chemical systems by using global exploration techniques, and kinetically controlled types of reactions that allow low-temperature synthesis of (possibly metastable) compounds are being developed.
Hobbies: Hiking, sports, cooking

I like refereeing because … it allows me to deploy my fault-finding talent.

The biggest problem that scientists face is … being misjudged geniuses.

The most significant scientific advance of the last 100 years has been … the discovery of X-ray diffraction by atomic lattices.

The most important thing I learned from my parents is … to work hard.

My favorite place on earth is … any island.

The best stage in a scientist's career is … when he is asked to complete sentences.

My biggest motivation is … endless curiosity.

Guaranteed to make me laugh is … watching sketches by, and with, Loriot.

I can never resist … Mozartkugeln.

My favorite author is … Honoré de Balzac ("La Comédie Humaine").

If I wasn't a chemist, I would be … a forest ranger.

The person who has had the greatest scientific influence on me is … Wilhelm Klemm.

If you were to revisit the start of your career, would you choose solid-state chemistry again? Which "big questions" would you address?

Yes, definitely. Again, I would be challenged by finding a way to plan the synthesis of new solids and materials and, as nature limits the number of realizable compounds and all their properties, I would develop a thesaurus comprising all validated known solids. Such a catalogue would be invaluable for fundamental and industrial research, yet its creation is a major, time-consuming project. Let's get it started!

What do you find most fascinating about solid-state chemistry?

That there are so many unsolved problems in experiment and theory, among them real intellectual challenges posed by extended solids as many-particle systems. Even in routine syntheses, I am fascinated by surprising discoveries, which often have intriguing aesthetics and puzzling complexity.

Which area in materials and solid-state chemistry do you predict a great future for?

There will be a renaissance of the synthesis of—in the chemical sense—new inorganic materials, with ever more sophisticated methods being applied, making use of the whole set of pressure and temperature parameters available. A synergetic interaction of theoretical and experimental exploration of the envisaged materials will substantially increase the success rate of this approach. During the past two decades, the "classical" synthesis became, in a sense, outweighed by nano- or mesostructuring of known materials. However, it still is one of the spearheads of innovation. In particular, a shortage of rare elements for functional materials forces us to realize comparable functions with ubiquitous elements. For achieving such solutions, the approaches of solid-state synthesis are indispensable.

Which of your compounds are you particularly proud of?

Binary compounds like Sb_2O_5, Ag_2O_3, CsO_3, Cl_2O_6, or Cs_2Pt, but also systematically explored materials, like intrinsically doped cuprates as models for the study of electronic and magnetic ordering phenomena or ternary silver oxides, which have led to the notion of d^{10}–d^{10} interactions as a general bonding principle. Finally, a new class of amorphous, high-performance ceramics consisting of Si, B, N, and C, which have been developed by a conceptual but partly also speculative approach.

What advice would you give to up-and-coming scientists?

To follow one's own compass rather than fashionable trends, to take up fundamental questions, to set high standards for themselves, and to try complying with them.

Your mentor was Rudolf Hoppe; what is the most important thing he taught you?

Rudolf Hoppe infected me with his enthusiasm for inorganic chemistry. He taught his students to think the unthinkable and to venture the nearly impossible. He almost militantly held the view that the inductive approach was the most appropriate for chemistry and provoked me to take on a contraposition, which ended up in the development of a deductive approach to inorganic solid-state chemistry.

What aspects of your job bring you the most and least pleasure?

I enjoy the high level of self-determination granted to me in my profession, this is a privilege that I very much appreciate. It is a special asset to do research with other, often young, people and to share the joy of new discoveries and new insights. Working on academic boards and committees that only pretend to be democratic gives me the least pleasure.

If you could change the German (or international) scientific system, what would you do first?

I would reinstall the primacy of science in government-financed research (industrial research must, of course, follow corporate goals). Excessive regulation by political guidelines, financial incentives, and arguable evaluation methods have led in many fields to high conformity and to distinct mainstream behavior. The results from research that deserves this term as it is pioneering cannot be planned; most likely the scientists themselves develop a notion of seminal questions. This "instinct" distinguishes the successful researcher from the others. The most effective instruments for the enhancement of research and science will be to provide optimal infrastructures with as much impartial sponsorship, and selection of the "best", as possible.

What do you think about h-indices and other bibliometric indicators?

These indices are not at all appropriate and do not even come close to measuring scientific quality objectively. It is an illusion to believe that the quality of researchers and research, or even their long-term standing, can be expressed in a single number without understanding the topic and knowing the scientist. These indicators are rather socioscientific indices; in the first instance, they reflect the dimension (number of scientists) of a discipline worldwide, citation behavior in the respective disciplines, and network structures. They boost and remunerate mainstream behavior, abet "politically" motivated citations, discriminate against pioneers and "lone wolves", just to mention some aspects. However, as long as these figures only add to the quite stimulating vanity fair, we could just go back to normal. It will be become highly detrimental, however, if decision-makers rely on these indices for granting funding resources or appointments, as is already commonly the case. This effect is catastrophic for young researchers who have to do "impact-factor engineering" for the sake of their career and thus align their research field, topic, and behavior according to this practice.

In your opinion, what qualities make a successful scientist?

A good scientist is visionary, fearless in his scientific thinking, competent in his profession, technically perfect, and last, but not least, shows enthusiastic dedication to his work.

The interview questions were provided by Bettina Lotsch (Ludwig-Maximilians-Universität, Munich, and Max Planck Institute for Solid State Research).

My 5 top papers:

1. "Homoatomic d^{10}–d^{10} Interactions: Their Effects on Structures and Chemical and Physical Properties": M. Jansen, *Angew. Chem.* **1987**, *99*, 1136–1149; *Angew. Chem. Int. Ed. Engl.* **1987**, *26*, 1098–1110.
   This Review outlines the experimental evidence for unconventional Ag^+–Ag^+ bonding interactions, first addressed as a general feature of d^{10} species when exploring multinary silver oxides during the second half of the 1970s. These aspects have interesting implications for related systems, including the exotic structures of elemental Zn and Cd.
2. "Ceramic Fibers for Matrix Composites in High-Temperature Engine Applications": P. Baldus, M. Jansen, D. Sporn, *Science* **1999**, *285*, 699–703.
   A novel class of ceramics based on random networks consisting of Si, B, N, and C was developed based on a conceptual approach. This material is surprisingly superior to traditional binary nitride or carbide ceramics with respect to the combination of properties that determine high performance in applications at elevated temperatures in air and under mechanical stress.
3. "A Concept for Synthesis Planning in Solid-State Chemistry": M. Jansen, *Angew. Chem.* **2002**, *114*, 3896–3917; *Angew. Chem. Int. Ed.* **2002**, *41*, 3746–3766.
   This review presents a concept for synthesis planning in solid-state and inorganic materials chemistry, and its feasibility by experimentally validating the predicted synthesis targets.
4. "Effects of relativistic motion of electrons on the chemistry of gold and platinum": M. Jansen, *Solid State Sci.* **2005**, *7*, 1464–1474.
   Conspicuous examples lending experimental evidence for relativistic effects are presented, including spontaneous disproportionation of elemental gold and the synthesis of "saltlike" Cs_2Pt.
5. "Ionic Ozonides": M. Jansen, H. Nuss, *Z. Anorg. Allg. Chem.* **2007**, *633*, 1307–1315.
   The chemistry of ionic ozonides has been extensively unraveled, providing various procedures for phase-pure syntheses, and full characterization of structure and properties. This rather complete work offers promising potential for the use of ionic ozonides in chemical synthesis and for studying p-type magnetism in solids.

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