

CV - Bo BRUMMERSTEDT IVERSEN



VILLUM INVESTIGATOR, PROFESSOR, DR. SCIENT ET TECHN., DIRECTOR
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Civil Status:

Born 22-6-1967 in Aarhus, Denmark. Danish citizen. Married to Head of Chemistry Department, Professor, Ph. D. Hanne Birgit Schiøtt. Two daughters (Signe, 2000; Marie, 1997)

Main research interests:

My research focuses on exploiting the tremendous power of structural studies to obtain a proper understanding of material properties. The research also involves materials synthesis, advanced property characterization as well as first principles computations. Parts of my work have been successfully transferred to industrial application. I have studied numerous energy materials (thermoelectrics, batteries, catalysts, magnets) where detailed crystallographic analysis has been a prerequisite for discovering and rationalizing relationships between synthetic procedures, dimensionality, doping, actual composition, chemical bonding, structural disorder, or thermal motion, and the resulting thermal, electronic and chemical properties of the materials. I have also made highly original contributions to nanoparticle synthesis, characterization and structure with emphasis on application of supercritical fluids. In this respect, I introduced in situ X-ray studies of solvothermal reactions using SAXS, WAXS and PDF analysis. Through in situ PDF analysis, I have obtained the first atomic scale insight into nucleation and exposed a fascinating chemical richness calling for a paradigm shift away from "one model fits all". I am a leading figure in X-ray electron density (ED) research where I, for example, have pioneered synchrotron-based studies. I have contributed strongly to ED method development, e.g., recently in assessment of core electron deformation, powder X-ray diffraction EDs and the maximum entropy method. In the last three years, I have been among the pioneers of the 3D- Δ PDF method based on analysis of diffuse X-ray and neutron scattering from single crystals.

- ~500 peer reviewed publications, 7 patents, ~20 popular science articles (Web of Science: H~60, Citations >14000, i20 ~220)
- ~10 invited lectures per year at international conferences and universities (total of several hundreds)
- Very broad international network, participant in various large projects funded by EU, US, AUS sources
- Principal investigator on grants totaling >65 mill. euro since 2000
- Intellectual responsible for IPR of the start-up company TEGnology
- Principal investigator on hundreds of beam time allocations at synchrotron, XFEL and neutron sources
- Responsible power user of beamline BL02B1 at SPring8 (2015 – 2020) and member of RIKEN
- Principal Investigator on the DanMAX beamline at MAX4

Education:

2010: Doctor of Technology from DTU ("PGEC materials for thermoelectric energy conversion")
2002: Doctor of Science from Aarhus University ("X-ray charge density studies of chemical bonding")
1995: Ph. D. (inorganic chemistry), AU (incl. 3 months at ANU, Canberra with Dr. Philip Reynolds)
1993: M. Sc. (Crystallography), AU (incl. 1 year at SUNY Buffalo with Professor Philip Coppens)
1990: B. Sc. (Chemistry and Physics), Aarhus University (AU)

Employments:

2004 -: Professor at Dep. of Chem., AU (Chair of Inorganic Chemistry)
2000 - 2003: Associate Professor at Dep. of Chem., AU
1998 - 2000: Assistant Professor at Dep. of Chem., AU
1996 - 1998: Post doc at Dep. of Chem., UC Santa Barbara (Prof. Galen Stucky)
1995 - 1996: Research Assistant Professor at Dep. of Chem., AU
2019: Guest professor at Stanford University, USA (4 months)
2015 -: International guest professor at University of Tsukuba, Japan (~3 weeks every year)
2005 -: Visiting professor at University of Western Australia (~1 month every year)
2001: Visiting professor at UC Santa Barbara (6 months)

Selected Awards & Honors:

2019: VILLUM Investigator
2017: Queen Margrethe II Science Prize (100 kkr)
2015: First Class Order of Dannebrog by Queen Margrethe II of Denmark ("Knighted")
2014: Grundfos Prize (1000 kkr)
2011: Elite Researcher Prize from the Danish Ministry of Science, Technology and Innovation (1200 kkr)
2011: Bjerrum-Brønsted-Lang Prize from the Royal Danish Academy of Science and Letter (25 kkr)

2011:	Fellow of the Danish Academy of Technical Sciences
2010:	Fellow of the Danish Natural Science Academy
2010:	Fellow of the Royal Danish Academy of Science and Letters
2009:	Danish Natural Science Academy Industry Prize
2009:	Rigmor and Carl Holst-Knudsen Science Prize (100 kkr)
1999:	Scientia Europaea Prize of the French Academy of Science (250 kkr)
1999:	Silver Medal of the Royal Danish Academy of Sciences and Letters

Administration:

- Director of VILLUM Investigator Center on Dynamic Crystallography (2020 -)
- Director of ESS Lighthouse (2019-2028, a national prestige project involving six Danish universities and Danish industry to exploit the large investment in ESS, MAX4 and E-XFEL)
- Director of the Aarhus University Center for Integrated Materials Research (2017 -)
- Director of the Danish National Research Foundation Center for Materials Crystallography (2010 - 2019, an international Centre of Excellence with partners in Germany, Italy, Australia, USA and Japan, ~25 post docs and ~50 PhD students)
- Director of the Danish Strategic Research Council Center for Energy Materials (2008 - 2012)
- Director of the Danish Strategic Research Council Center for Thermoelectric Energy Conversion (2014-18)
- Member of the Scientific Advisory Council (SAC) at the European Spallation Source (ESS) (2013-2016); of the Board of the MAX VI synchrotron (2016 - 2019), of the Board of the ASTRID synchrotron (2015 -); of the Steering Committee of the DanMax Beamline at MAX IV.
- Chairman of the Commission on Charge, Spin and Momentum densities under European Crystallographic Association (2004-2012); of the Research Committee at Department of Chemistry, Aarhus University (2015 - 2017); of the Scientific and Technical Advisory Panel (STAP) on Diffraction at the ESS (2011-2014)
- Member of the ESS STAP on Data Management and Scientific Computing (2017 -); of the Board of the Danish Chemical Society (2001-2005); of the Board of the Danish Centre for Synchrotron and Neutron Scattering (2004 -); of the Commission on Charge, Spin and Momentum densities under the International Union of Crystallography (2001 - 2011); of the Board of the Danish Battery Society (2013 - 2016); of the Board of the Department of Chemistry, AU (2008 - 2014); of the Leadership team of iNANO (2013 -); of the Board of the LINX association (2016 -); of the Academic Council of the Faculty of Science & Technology, AU (2004 -); of the PhD Admission Committee at the Faculty of Science & Technology, AU (2013 - 2019); of the Research Committee at the Faculty of Science and Technology, AU (2015 - 2017); of the iNANO Ph. D. Committee (2008 - 2013); of Advisory boards on Energy and on Synchrotron/Neutron science for the Danish Ministry of Higher Education & Science
- Member of scientific evaluation committees at all levels (Departments, Institutes, Professor, Director, Head of Department, Dean, Associate Professor, Assistant Professor, post doc, PhD, MSc), typically ~5/year
- Organizer the Annual Danish Chemical Society Aarhus Winter Meeting since 2005 – (one-day meeting with ~ 200 participants and talks from six very high profile researchers)
- Organizer of the summer school on synchrotron, neutron, XFEL in materials science (2009, 2018)
- Reviewer of ~50 papers per year including all major journals
- I have acted as referee for the European Commission, European Research Foundation, the US National Science Foundation, eight different National Research Councils, and the HasyLab Beamtime review
- Leadership courses by Learn2Lead (6 days), the DNRF (4 days), the Villum Foundation

Education:

- PhD, MSc, BSc and Postdocs (as responsible PI): 51 post docs, 49 PhD degrees, 80 Master degrees, 82 bachelor degrees. Many of my students and post docs hold prominent positions in academia or industry providing a large and influential network. This includes 4 Full Professors, 10 Associate professors, 4 Assistant Professors, 8 Staff scientists and 40+ Scientists or Managers in Industry.
- Lecturer and course responsible: General Chemistry (5 or 10 ECTS, 200-400 students, fall semester 2003-2018, 2020), Inorganic Materials Chemistry (10 ECTS, 50-100 students, fall semester 2003-2018, 2020)

Innovation, Industry Collaboration and Technology Transfer:

- Thermoelectrics: Introduced thermoelectrics research to Denmark in the late 90's. Published ~200 original papers in the field and inventor of four patents on Zn_4Sb_3 . IPR formed the basis of the company TEGnology.
- Hydrothermal Liquefaction (HTL): Developed together with the Danish company SCF Technologies the unique HTL technology for robust conversion of all types of wet biomass to bio-fuel. Initiator of AU project to build HTL pilot plant with broad industry participation.
- Supercritical synthesis: Introduced supercritical flow synthesis of nanoparticles in Denmark (>100 original publications). The technology has been now transferred to The Danish Technological Institute for scale up and forms the core of numerous projects in collaboration with industry such as the MICROPOWER fuel cell technology for hearing aids
- Alkali ion batteries: In collaboration with Haldor Topsøe A/S a battery laboratory has been built at AU.
- Linking Industry to Neutrons and X-rays (LINX): AU responsible for branch of a national industry portal