ANDREA CORNIA

Curriculum Vitae

SUMMARY

Andrea CORNIA was born in Modena (Italy) in 1968, where he graduated in Chemistry *cum laude* in 1992. In 1995 he completed his PhD studies in Chemical Sciences at the University of Parma (Parma-Modena-Ferrara Consortium) working on the synthesis, structure and magnetism of high-nuclearity clusters and extended systems based on 3*d* metals, under the supervision of Professors A. Fabretti Costantino (University of Modena) and D. Gatteschi (University of Florence). He defended his Thesis in October 1996 and in the same year he received the INCM (now INSTM)* award for the best PhD Thesis in Materials Chemistry. From November 2000 to April 2005 he worked as an Associate Researcher at the Department of Chemistry (now Department of Chemical and Geological Sciences) of the University of Modena and Reggio Emilia, where he currently holds an Associate Professor position in General and Inorganic Chemistry. In 2006 he was awarded the "Raffaello Nasini" Prize by the Inorganic Chemistry Division of the Italian Chemical Society for his contributions to the understanding of molecular nanomagnetism. He has spent short research periods abroad, including a visiting professorship at Universitè Joseph Fourier in Grenoble, France, in 2010.

His research interests straddle the interface between chemistry and physics, ranging from the synthesis and structural investigation of magnetic molecular materials to their advanced characterization by physical methods. His current research activity focusses on the organization of Single Molecule Magnets (SMMs) on metal surfaces and on the realization of molecular electronic devices embodying SMMs as active components. He has co-authored **161** scientific publications and more than **200** congress presentations and has delivered **48** invited seminars. Hirsch *h*-index: **44** (from apps.webofknowledge.com).

- co-author of **161** scientific publications, including **5** book contributions, **11** papers on *Angewandte Chemie*, **3** papers on *Journal of the American Chemical Society*, **1** paper on *Nature Materials* (*Nat. Mater.* **2009**, *8*, 194) and **1** paper on *Nature* (*Nature* **2010**, *468*, 417);
- co-author of **2** Hot Papers in *Angewandte Chemie* (*Angew. Chem. Int. Ed. Engl.* **1999**, *38*, 2264; ibid. **2003**, *42*, 1645);
- co-author of **5** publications that have gained the cover of *Angewandte Chemie* (**1995**, *34*/4; **1997**, *36*/24; **2002**, *41*/23), *Chemical Communications* (**2000**, *9*) and *Chemistry – A European Journal* (**2008**, *14*/25);
- co-author of papers highlighted by top-ranked journals (*Angew. Chem. Int. Ed.* **2003**, *42*, 1645 highlighted on *Nat. Mater.* **2003**, *2*, 354; *Adv. Mater.* **2009**, *21*, 167 highlighted on *Nature* **2008**, *455*, 838; *Nat. Mater.* **2009**, *8*, 194 highlighted on *Nat. Mater.* **2009**, *8*, 165);
- co-author of **3** papers regarded as relevant products of research in VTR2001-2003 (*Chem. Eur. J.* **2001**, *7*, 1796 in Panel 03 – Chemical sciences; *Angew. Chem. Int. Ed.* **2002**, *41*, 4517 in Panel 03 – Chemical sciences; *Angew. Chem. Int. Ed.* **2003**, *42*, 1645 in Panel 15c – Sciences and technologies of nano/microsystems);
- co-author of **more than 200** congress presentations and **48** invited seminars;
- referee of some top-ranked international journals, including *Angewandte Chemie, European Journal of Inorganic Chemistry, Chemistry – A European Journal, Advanced Materials (Wiley–VCH), Journal of the American Chemical Society, Inorganic Chemistry, Chemistry of Materials, Langmuir, Crystal Growth & Design (ACS), Physical Review B, Physical Review Letters (APS), Journal of Inorganic Biochemistry, Inorganica Chimica Acta, Inorganic Chemistry Communications (Elsevier)*; *Chemical Science, Chemical Communications, CrystEngComm, Dalton Transactions, Chemical Society Reviews, Physical Chemistry Chemical Physics (RSC)*; *New Journal of Physics, Journal of Physics: Condensed Matter, Nanotechnology* (IOP Publishing), *Nature Protocols, Nature*

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Chemistry (NPG);

- involved in national and international research projects, among which several PRIN and CNR projects, PRA MESMAG-*Mesoscopic Scale Magnetism in Molecular Clusters* (INFM, **1999-2001**), MOLNANOMAG *Molecules as Nanomagnets* (UE, 5FP, **2000-2004**), FIRB *Nanoorganization of Hybrid Inorganic/Organic Molecules with Magnetic and Optical Properties* (MIUR, **2002-2006**), QUEMOLNA *Quantum Effects in Molecular Nanomagnets* (UE, 6FP, **2004-2008**) and Network of Excellence MAGMANet *Molecular approach to nanomagnets and multifunctional materials* (UE, 6FP, **2005-2009**);
- coordinator of PRISMA Project *Driving Current through Single Molecule Nanomagnets* (INSTM, partially financed, **2003-2005**, 10 keuro);
- local coordinator of Modena Research Unit in PRIN2005 Project *Designing and self-organisation of molecular architectures for nanomagnets and optoelectronic systems* (MIUR, **2006-2007**, local budget 115 keuro);
- italian partner in NanoSci-ERA Project *SMMTRANS–Three-terminal Transport through Single Molecule Magnets* (UE, **2007-2010**, local budget 200 keuro);
- *co-proposer* of *International Research and Training Project in Molecular Spintronics* (Fondazione Cassa di Risparmio di Modena, **2009-2010**, budget 85 keuro);
- local coordinator of Modena Research Unit in PRIN2008 Project *Molecular and nanocrystalline structures with magnetic, photo-magnetic and photo-emitting properties, their organisation on surfaces, in polymeric films or in sol-gel* (MIUR, **2010-2012**, local budget 70 keuro);
- local coordinator of Modena Research Unit in FIRB – Accordo ex art.7 del D.M. 378 del 26/03/04 *Molecular nanomagnets on metallic and magnetic surfaces for applications in molecular spintronics* (MIUR **2012-2014**, local budget 257 keuro);
- *Head* of Integrated Laboratory IS – Imaging and Surface Spectroscopy within Network of Excellence MAGMANet;
- (*as tutor*) *Electronic Conduction Devices Based on Molecular Nanomagnets* (one-year post-doctoral research grant funded by Fondazione Cassa di Risparmio di Modena, **2005-2006**, budget 18 keuro);
- (*as tutor*) *Organization of Single Molecule Magnets on Metal Surfaces* (two-years post-doctoral research grant funded at 50% by INSTM, **2005-2007**, budget 18 keuro);
- (*as tutor*) *Synthesis, structural and magnetic characterization of molecular nanomagnets* (one-year research and training grant funded at 50% by INSTM, **2010-2011**, budget 9 keuro);
- (*as tutor*) *Synthesis of functionalized molecular nanomagnets* (one-year post-doctoral research grant funded at 50% by INSTM, **2011-2012**, budget 11 keuro).

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* National Interuniversity Consortium on Materials Science and Technology

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PERSONAL INFORMATION

Place of birth: Modena (Italy)

Date of birth: May 24th, 1968

Nationality: italian

Marital status: unmarried

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Skype name: **a.cornia**

ACADEMIC CAREER

1992: LAUREA in CHEMISTRY 110/110 *cum laude*, University of Modena (published: A. Cornia, U. Folli, S. Sbardellati, F. Taddei, "*Electron Transfer in the Reactions of Organic Trichloromethyl Derivatives with Iron(II) Chloride*", *J. Chem. Soc. Perkin Trans. 2* **1993**, 1847–1853); Thesis defended on July 21st, **1992**;

1992-1995: Ph.D. IN CHEMICAL SCIENCES, University of Parma (Parma–Modena–Ferrara Consortium), *"Magnetic Molecular Materials: from High Nuclearity Spin Clusters to Extended Systems"*, supervisors: Prof. A. Fabretti Costantino (University of Modena) and Prof. D. Gatteschi (University of Florence); PhD Thesis defended on October 3rd, **1996**;

1995: CORSO DI PERFEZIONAMENTO IN METODOLOGIA DELLA RICERCA DI LABORATORIO (a.a. 1995-1996), University of Modena;

(activity interrupted from 3/6/1996 to 13/5/1997 during civil service)

1997-1999: POST-DOCTORAL POSITION at the Faculty of Mathematical, Physical and Natural Sciences, University of Modena, Chemical Area (3/6/1997 – 2/6/1999);

1999-2000: POST-DOCTORAL POSITION at the University of Modena and Reggio Emilia (*"Spin Dynamics in Magnetic Molecular Nanostructures"*, supervisor: Prof. A. Fabretti Costantino, 3/6/1999 – 3/1/2000);

2000: POST-DOCTORAL POSITION at the Department of Chemistry, University of Modena and Reggio Emilia ("*The Origin of Magnetic Anisotropy in Metal Ion Nanoclusters*", supervisor Prof. A. Fabretti Costantino, 1/2/2000 – 31/10/2000);

2000-2005: ASSOCIATE RESEARCHER in General and Inorganic Chemistry (SSD CHIM/03), University of Modena and Reggio Emilia (1/11/2000 – 19/04/2005);

2005-today: ASSOCIATE PROFESSOR in General and Inorganic Chemistry (SSD CHIM/03, settore concorsuale 03/B1 – Fondamenti delle scienze chimiche e sistemi inorganici), University of Modena and Reggio Emilia (20/04/2005 – present);

2010: VISITING PROFESSOR at Universitè Joseph Fourier in Grenoble, France (1/06/2010 – 31/08/2010).

AWARDS

1996: INCM (now INSTM – National Interuniversity Consortium on Materials Science and Technology) PRIZE for the best Ph.D. Thesis in Materials Chemistry, awarded during the *First National Congress on Materials Science and Technology*, Lerici (SP), April 2-4, **1997**.

2006: "RAFFAELLO NASINI" PRIZE of the Inorganic Chemistry Division of the Italian Chemical Society (awarded during *XXIInd National Congress of Italian Chemical Society*, Florence, September 10-15, **2006**). Motivation: **"for the significant and original contributions to a deeper understanding of molecular nanomagnetism through the design and synthesis of particular molecular systms and through the development of new sophisticated investigation techniques".**

2013: **Habilitation to full-professor position in area 03/B1 "Fondamenti delle Scienze Chimiche e Sistemi Inorganici"** (ASN 2012 call) with the following overall evaluation:

"La Commissione, nel valutare la domanda del Dr. Cornia Andrea per l'abilitazione al ruolo di Professore Ordinario, ha preliminarmente analizzato i 20 lavori scelti dal Candidato, ed avendoli giudicati pertinenti al settore 03/B1 "Fondamenti Delle Scienze Chimiche e Sistemi Inorganici" ha proceduto nella valutazione della domanda, prendendo atto che, in accordo ai dati forniti dal MIUR, il Dr. Cornia Andrea risulta aver superato tre sui tre parametri definiti dal Decreto Ministeriale n. 76 del 7 giugno 2012. In questo caso, in accordo al Verbale del 21 marzo 2012, la Commissione giudica "soddisfacente ai fini dell'abilitazione l'ottenimento di ulteriori 4 punti derivanti dalla valutazione complessiva delle pubblicazioni e dei titoli diversi dalle pubblicazioni". La Commissione ha proceduto all'analisi quantitativa dei parametri definiti nel succitato Verbale per le pubblicazioni scientifiche e il parametro l1) dei titoli diversi dalle pubblicazioni. La produzione scientifica del Candidato è stata giudicata eccellente (10 punti) e la sua capacità di guidare la ricerca eccellente (10 punti). La Commissione ha, quindi, proceduto all'analisi delle altre voci del Curriculum: anche sulla base dei criteri presentati dalla Commissione nel Verbale del 21 marzo 2012, il CV complessivo è stato giudicato eccellente. Sulla base dell'analisi completa delle pubblicazioni, del CV e dei criteri adottati, poiché il candidato ha ottenuto più dei 4 punti richiesti, la Commissione all'unanimità giudica che il Dr. Cornia Andrea sia idoneo a ricoprire il ruolo di Professore Ordinario."

AFFILIATIONS

- DEPARTMENT OF CHEMISTRY, University of Modena and Reggio Emilia (**2000-2012**);
- DEPARTMENT OF CHEMICAL AND GEOLOGICAL SCIENCES, University of Modena and Reggio Emilia (**2012-today**); www.dscg.unimore.it;
- FACULTY OF MATHEMATICAL, PHYSICAL AND NATURAL SCIENCES, University of Modena and Reggio Emilia (**2000-2012**);
- DOCTORATE IN CHEMISTRY, University of Modena and Reggio Emilia (**2000-2005**);
- DOCTORATE SCHOOL IN PHYSICS AND NANOSCIENCES, University of Modena and Reggio Emilia (**2006-present**); www.nano-phdschool.unimore.it;
- NATIONAL INTERUNIVERSITY CONSORTIUM ON MATERIALS SCIENCE AND TECHNOLOGY (INSTM); www.instm.it;
- EUROPEAN INSTITUTE OF MOLECULAR MAGNETISM (EIMM);

www.unizar.es/eimm2;

- ITALIAN CHEMICAL SOCIETY (SCI) (**2006-today**); www.soc.chim.it;
- ITALIAN ASSOCIATION OF CRISTALLOGRAPHY (AIC) (**2014-today**); www.cristallografia.org;

RESEARCH ACTIVITY

GENERAL MOTIVATION. The ever-increasing storage capacity and speed of electronic devices, along with web-based communication resources, are having a revolutionary social impact and are expected to remain a central issue in national and transnational scientific/technological roadmaps. However, requests from the market are pressing and new paradigms for data storage and processing must be developed. For instance, digital information is produced at an ever-increasing pace and industries are pushing miniaturization to its physical limits, in such a way that the storage capacity of hard-disk drives approximately doubles every 13 months ("Kryder's law"). By extrapolation, around 2020 the market will request to encode a single bit in a few square nanometers, which is already close to molecular sizes. In a long-term perspective, the realization of molecule-based magnetic devices is thus expected to have a very positive impact on economic and social development. As such, it fulfills the requisites for the "Key Enabling Technologies" defined by Horizon2020.

The research group coordinated by Prof. Andrea Cornia at the Department of Chemical and Geological Sciences (**CORNIA*Group***, www.corniagroup.unimore.it) faces the challenge of incorporating magnetic molecular materials into devices for information storage and processing, a burgeoning research area with a huge potential industrial/market relevance. In particular, the group focusses on the synthesis, structure and physical properties of **Single-Molecule Magnets (SMMs)**, a class of coordination compounds exhibiting a memory effect. Classical and quantum effects are found to coexist in the behaviour of these nanoscale magnetic units, which are of great interest in the emerging field of molecular spintronics. The current research activity of **CORNIA*Group*** targets the organization of SMMs on metal surfaces and on the realization of molecular electronic devices embodying SMMs as active components.

The central goals in this field, encompassing the development of both new materials and new working principles, are:

(i) the **design and synthesis of new magnetic molecules** exhibiting better performances and operating in a manageable temperature range;

(ii) the **construction of devices** incorporating such molecules (e.g. ultra-thin films on metal surfaces and nanojunctions);

(iii) the **detection and manipulation of electronic spin states** using external stimuli, such as electric currents, magnetic fields or light.

Among the most important achievements of **CORNIA*Group*** are the development of synthetic protocols enabling to preserve the molecular structure and magnetic behaviour of SMMs on a metal surface as well as to control the anchoring geometry.

EXPERTISE AND SKILLS. The activity of **CORNIA*Group*** is markedly multidisciplinary and straddles the interface between chemistry and physics; it has an established tradition in:

- **inorganic, organic and metal-organic synthesis**;
- **coordination chemistry;**
- **supramolecular chemistry**, applied to the synthesis of nanostructured inorganic materials;
- **structural analysis** by single-crystal X-ray diffraction;
- **structural investigation** by spectroscopic methods;

- **crystallization techniques**;
- **molecular magnetism** (experimental and theoretical aspects);
- investigation of the electronic structure of paramagnetic systems by **advanced physical methods** (High-Frequency EPR spectroscopy, High-Field-Low-Temperature magnetometry, etc.), both on single-crystal and on polycrystalline samples;
- **single-molecule magnets**.

In the last ten years, the research carried out in **CORNIA*Group*** has further expanded to include:

- **surface science** (preparation and characterization of self-assembled monolayers);
- **molecular electronics and molecular spintronics**.

MAIN ACHIEVEMENTS. The initial research activity and training of Andrea Cornia were mainly devoted to the synthesis of large magnetic clusters of first-series transition-metal ions, and in particular to iron(III) polynuclears using a **supramolecular approach** based on template effect, host-guest interactions and molecular recognition [publications No. 9, 10, 12, 16, 57]. An important result, obtained during his Ph. D. studies, was the template synthesis of hexairon(III) ring-shaped clusters using alkali-metal ions (Li^+, Na^+), which are hosted in the center of the ring and actively modulate exchange-coupling interactions and magnetic anisotropy [publications No. 19, 26, 40, 44, 52, 65]. Thanks to their relatively simple structure, these rings have become the target of extensive investigation as models for one-dimensional antiferromagnets and, more recently, as possible molecular systems for quantum computation. The continuing attention toward the rational design, controlled alteration and functionalization of molecular magnetic nanostructures [publications No. 27, 30, 33, 79, 94, 96] has been paralleled by a growing interest for solid-state characterization techniques. Andrea Cornia has gained sound expertise in **structure determination** by single-crystal X-ray diffraction methods, as well as in the collection, interpretation and simulation of magnetic data. Worth mentioning is a highly cited structural study on the prototypical SMM, Mn_{12}–*acetate*, which has shed light on the origin of transverse magnetic anisotropy, resolving a long-debated issue in molecular magnetism [publications No. 75, 78]. Low-temperature X-ray diffraction data on a single crystal of Mn_{12}–*acetate* have revealed that the disorder of the lattice acetic acid molecules is transmitted to the Mn_{12} core via hydrogen-bond interactions. As a result, the tetragonal crystal lattice of Mn_{12}–*acetate* comprises inequivalent Mn_{12} clusters containing a different number of hydrogen-bonded acetic acid molecules. The resulting symmetry lowering explains the origin of second-order transverse anisotropy, which is in principle forbidden in tetragonal symmetry and determines the fine details of quantum tunneling of the magnetization. The validity of the structural model proposed by Cornia *et al.* has been confirmed by a number of subsequent spectroscopic studies carried out by other groups.

In the field of **magnetic characterization techniques**, Andrea Cornia has reported pioneering applications of high-field torque magnetometry to magnetic molecular materials, such as SMMs and antiferromagnetic rings, developing the so-called torque-step method for the determination of spin-hamiltonian parameters [publications No. 44, 48, 58, 65, 69, 72, 74]. The method, which can be successfully applied to single crystals down to microgram size, allows to map the excited spin levels in antiferromagnetically-coupled systems by following the field-induced level crossings, which determine abrupt changes of anisotropy. The results have quasi-spectroscopic precision and demonstrate how useful can be the combination of high magnetic fields and low temperatures for a detailed characterization of molecular magnetic compounds.

Combined use of accurate structural data and of High-Frequency (HF) EPR has permitted to highlight important **magneto-structural correlations** in SMMs of the Mn_{12} and Fe_4 families, contributing to a sound understanding of the origin of magnetic anisotropy and of quantum tunneling effects. For Mn_{12} complexes, a detailed HF-EPR study on a single crystal of an axially-symmetric derivative has allowed to clearly detect the in-plane fourth-order anisotropy

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in the $S = 10$ ground state and to relate it to the orientation of the Jahn-Teller elongation axes of the constituent manganese(III) ions, *i.e.* to molecular structure [publication No. 112]. The extensive investigation of tetrairon(III) propeller-like complexes with an $S = 5$ ground state and of related systems synthesized in **CORNIA*Group*** has provided a solid understanding of the origin of magnetic anisotropy. It has further revealed a simple relationship between the propeller's pitch and the axial anisotropy in both its second-order and fourth-order components [publications No. 42, 88, 103, 111, 117, 128, 131, 132, 149, 151, 161]. The unique chemical flexibility and structural robustness of such Fe_4 complexes has been exploited in **CORNIA*Group*** to clarify the impact of intermolecular interactions on quantum relaxation [publications No. 143, 154] as well as to assemble multifunctional materials [publication No. 145].

The unique magnetic behaviour of SMMs, which exhibit magnetic hysteresis at the molecular level, has suggested a number of applications in **molecular electronics and spintronics**. Therefore, the recent research activity of **CORNIA*Group*** has expanded further to include surface science and molecular electronics [publications No. 105, 124, 141, 156]. Major targets are (*i*) the characterization of SMMs in non-crystalline environments like polymeric matrices, Langmuir-Blodgett films and (sub)monolayers at surfaces, to ascertain the effect of the environment on molecular magnetism; (*ii*) the organization of SMMs on metal surfaces in order to probe individual clusters by scanning probe techniques like Spin-Polarized STM, and Electron Spin Noise STM; (*iii*) the realization of molecular electronic devices embodying SMMs as active components (spin transistors, spin valves and magnetic memory units). Work in this newly-born branch of molecular magnetism must tackle formidable challenges, like (*i*) developing suitable synthetic protocols to organize molecules while fully preserving their complex molecular structures (SMM are intrinsically labile and considerably more fragile as compared with simple metal-organic complexes or with organic molecules); (*ii*) developing techniques for the magnetic characterization of thin films down to monolayers and submonolayers, which cannot be investigated using traditional techniques like SQUID magnetometry. To this aim, established methods for surface analysis, like AFM, STM, XPS and ATR-IR, must be complemented with advanced techniques like ToF-SIMS (for structural analysis) and XAS/XMCD (for magnetic analysis). Extensive efforts have been carried out by **CORNIA*Group*** and co-workers to elucidate the chemical aspects of Mn_{12} deposition on gold surfaces through the synthesis of suitably-functionalized derivatives and the use of STM, AFM, XPS, XAS/XMCD and MCD for the characterization of surface adsorbates [publications No. 82, 99, 100, 113, 114]. XAS and XMCD experiments at subkelvin temperatures, carried out at synchrotron light-sources using a world-unique experimental apparatus, have clearly shown that Mn_{12} clusters are redox unstable at gold surfaces. Reduction of a significant fraction of metal ions to manganese(II) – occurring at the expenses of either manganese(III) or manganese(IV) – has been detected in all samples investigated. Furthermore, repeated field sweeps have failed to reveal any magnetic hysteresis for the (sub)monolayers [publication No. 120]. These important results have prompted the search for alternative classes of SMMs. The above-mentioned family of tetrairon(III) complexes, developed in **CORNIA*Group***, are providing the robustness, redox stability and ease of functionalization required for direct deposition on metal surfaces or for deposition via ligand exchange on a pre-functionalized surface [publications No. 111, 115, 136, 138, 140, 152, 160]. Some derivatives even withstand evaporation in UHV conditions and offer the rare possibility of depositing a SMM on a surface without chemical manipulations [publications No. 127, 150]. A breakthrough result has been recently achieved in this field, namely the observation of magnetic memory and quantum relaxation effects in SMMs wired to a gold surface [publications No. 121, 123, 130, 137].

Closely related to the deposition on surfaces is the construction of SMM-based **spintronic devices** like spin transistors, spin valves and magnetic memory units. Here, research aims at individuating new directions in the study of SMMs and in their electronic control. Initial attempts to trap Mn_{12} clusters between nanoelectrodes in a single-molecule transistor geometry has led to devices displaying unusual electron transport properties [publication No. 104]. More recently, results on tetrairon(III) complexes have been presented, with these molecules embedded in nanogaps [publications No. 133, 147, 155], linked to carbon

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nanotubes [publication No. 122] or to metal nanoparticles [publication No. 153].

COLLABORATIONS. Research at **CORNIA*Group*** is carried out in collaboration with many national and international co-workers. Here's is a non-exhaustive list:

- **Laboratory of Molecular Magnetism (LA.M.M.)**, Department of Chemistry "U. Schiff", University of Florence and INSTM, Sesto Fiorentino, Florence, Italy (R. Sessoli, D. Gatteschi, A. Caneschi, M. Mannini, L. Sorace);
- **Kavli Institute of Nanoscience**, Delft University of Technology, Delft, The Netherlands (H. S. J. Van der Zant)
- **Institut fuer Theoretische Physik**, Aachen, Germany (M. R. Wegewijs)
- **Laboratoire National des Champs Magnétiques Intenses–CNRS**, Grenoble, France (A.-L. Barra)
- **Institut Néel–CNRS**, Grenole, France (W. Wernsdorfer)
- **Institut de Minéralogie et de Physique des Milieux Condensés**, Université Pierre et Marie Curie, Paris, France (Prof. Ph. Sainctavit)
- **Physikalisches Institut**, Universität Stuttgart, Stuttgart, Germany (Dr. L. Bogani)

The members of **CORNIA*Group*** have carried out experimental activity in numerous european and extra-european laboratories, including **Laboratory of Molecular Magnetism** (Florence, Italy), **Laboratoire National des Champs Magnétiques Intenses–CNRS** (Grenoble, France), **National High Magnetic Field Laboratory** (Tallahassee, USA), **European Synchrotron Radiation Facility** (Grenoble, France), **ELETTRA** synchrotron (Basovizza, Trieste), **BESSY** synchrotron (Berlin, Germany) and **Kavli Institute of Nanoscience** at Delft University of Technology (Delft, The Netherlands).

Andrea Cornia has established many fruitful collaborations with both chemists and physicist, experimentalists and theoreticians (see publication list), contributing to the development of a truly multidisciplinary approach to molecular magnetism [publication No. 49]**.**

INSTRUMENTATION. *In-house* facilities available at **CORNIA*Group*** are:

- *Laboratory for fine organic, metal-organic and inorganic synthesis*, equipped with state-of-the-art apparatus for low-temperature reactions and for the handling of air-sensitive chemicals (inert gas line, dry-box);
- *Chemical and structural characterization techniques* in the solid state and in solution including elemental analysis,[a] single-crystal X-ray diffraction (down to 100 K),[b] multinuclear NMR,[b] UV-Vis,[a] fluorescence[a] and vibrational (IR,[a] Raman[b]) spectroscopies, mass spectrometry,[b] TEM,[b] SEM;[b]
- *Laboratory for surface science*, including standalone hood for clean operations, hydrogen generator for the flame annealing of metal substrates, ultrasonic bath, and *surface-analysis techniques* (AFM, STM, MFM).

Thanks to a long-standing and daily collaboration with the Laboratory of Molecular Magnetism headed by Prof. Roberta Sessoli atand Prof. Dante Gatteschi at the University of Florence (Italy), the group has routine access to *magnetic characterization techniques*, such as DC and AC susceptibility measurements, vibrating-sample and torque magnetometry and multiband EPR spectroscopy. *Electrochemical methods* (CV, DPV, etc.) are also available through a collaboration with the Electroanalysis Group headed by Prof. Renato Seeber at the Department of Chemical and Geological Sciences.

The team has regular access to *large scale facilities* for advanced experiments in X-ray diffraction (ESRF, Grenoble; ELETTRA, Trieste), high-field methods such as EPR and torque

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magnetometry (LNCMI-CNRS, Grenoble; NHMFL, Tallahassee), and surface analysis like XPS and XAS/XMCD (ELETTRA, Trieste; BESSY, Berlin; SLS, Villigen; ESRF, Grenoble; Soleil, Paris).

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[a]available at Laboratorio di Analisi Chimiche (LADAC); [b]available at Centro Interdipartimentale Grandi Strumenti (CIGS).

SCIENTIFIC RECORDS

Publications: **161** (including **5** book contributions)

Congress Presentations: > **200** (as presenter or co-presenter of oral or poster contributions)

Invited seminars: **48**

Conferences: **92**

Hirsch h-index: **44** (from apps.webofknowledge.com)

Other: COVER of *Angew. Chem. Int. Ed.* (No. *34*/4, **1995**)

COVER of *Angew. Chem. Int. Ed.* (No. *36*/24, **1997**)

COVER of *Angew. Chem. Int. Ed.* (No. *41*/23, **2002**)

COVER of *Chem. Commun.* (No. 9, **2000**)

COVER of *Chemistry – A European Journal* (No. *14*/25, **2008**)

VERY IMPORTANT PAPER, *Angew. Chem. Int. Ed.* **1999***, 38,* 2264 (chosen for press release)

HOT PAPER, *Angew. Chem. Int. Ed.* **2003**, *42*, 1645

NATURE MATERIALS HIGHLIGHT (Research News, *Nat. Mater.* **2003**, *2*, 354) for paper *Angew. Chem. Int. Ed.* **2003**, *42*, 1645

NATURE HIGHLIGHT (*Nature* **2008**, *455*, 838) for paper *Adv. Mater.* **2009**, *21*, 167

NATURE MATERIALS HIGHLIGHT (News and Views, *Nat. Mater.* **2009**, *8*, 165-166) for paper *Nat. Mater.* **2009**, *8*, 194

HIGHLIGHT ON WWW.PHYSORG.COM (http://www.physorg.com/news155820171.html) for paper *Nat. Mater.* **2009**, *8*, 194.

CHEMISTRY WORLD HIGHLIGHT (*Chemistry World* **2010**, December issue and Online News on Oct. 27, 2010) for paper *Nature* **2010**, *468*, 417

THREE PAPERS REGARDED AS RELEVANT PRODUCTS OF RESEARCH IN **VTR2001-2003**. Panel 03 – Chemical sciences: *Chem. Eur. J.* **2001**, *7*, 1796; *Angew. Chem. Int. Ed.* **2002**, *41*, 4517. Panel 15c – Sciences and technologies of nano/microsystems: *Angew. Chem. Int. Ed.* **2003**, *42*, 1645

INTERVIEW ON ITALIAN RADIO (**RadioUno**, **Radiocampus program** by Alma Grandin) on March 3, 2009 (for results published in *Nat. Mater.* **2009**, *8*, 194).

RESEARCH included in the press release of the University of Modena and Reggio Emilia on February 22, 2009, on November 14, 2010 and on November 15, 2010 (for results published in *Nat. Mater.* **2009**, *8*, 194 and on *Nature* **2010**, *468*, 417)

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Referee activity: <u>*Journals*</u>*: Angewandte Chemie, European Journal of Inorganic Chemistry, Chemistry – A European Journal, Advanced Materials (Wiley–VCH), Journal of the American Chemical Society, Inorganic Chemistry, Chemistry of Materials, Langmuir, Crystal Growth & Design (ACS), Physical Review B, Physical Review Letters (APS), Journal of Inorganic Biochemistry, Inorganica Chimica Acta, Inorganic Chemistry Communications (Elsevier); Chemical Science, Chemical Communications, CrystEngComm, Dalton Transactions, Chemical Society Reviews, Physical Chemistry Chemical Physics (RSC); New Journal of Physics*, *Journal of Physics: Condensed Matter, Nanotechnology* (IOP Publishing), *Nature Protocols*, *Nature Chemistry* (NPG).

<u>*Research Projects*</u>*: Deutsche Forschungsgemeinschaft (Germany), International Center for Frontier Research in Chemistry (France), National Science Center (Poland), National Research Council (Romania), MIUR (Italy).*

Projects: involved in many national and international research projects, among which:

- PRA-INFM MESMAG-*Mesoscopic Scale Magnetism in Molecular Clusters* (INFM, **1999-2001**);
- MOLNANOMAG *Molecules as Nanomagnets* (UE, 5FP, **2000-2004**);
- FIRB *Nanoorganization of Hybrid Inorganic/Organic Molecules with Magnetic and Optical Properties* (MIUR, **2002-2006**);
- QUEMOLNA *Quantum Effects in Molecular Nanomagnets* (UE, 6FP, **2004-2008**);
- (*as coordinator*) PRISMA *Driving Current through Single Molecule Nanomagnets* (INSTM, partially financed, **2003-2005**, 10 keuro);
- (*as local coordinator of Modena Research Unit*) PRIN2005: *Designing and self-organisation of molecular architectures for nanomagnets and optoelectronic systems* (MIUR, **2006-2007**, local budget 115 keuro);
- (*as italian partner*) NanoSci-ERA *SMMTRANS–Three-terminal Transport through Single Molecule Magnets* (UE, **2007-2010**, local budget 200 keuro);
- (*as co-proposer*) *International Research and Training Project in Molecular Spintronics* (Fondazione Cassa di Risparmio di Modena, **2009-2010**, budget 85 keuro);
- (*as member of INSTM node*) Network of Excellence MAGMANet *Molecular approach to nanomagnets and multifunctional materials* (UE, 6FP, **2005-2009**);
- *Head* of Integrated Laboratory IS – Imaging and Surface Spectroscopy within Network of Excellence MAGMANet;
- (*as local coordinator of Modena Research Unit*) PRIN2008: *Molecular and nanocrystalline structures with magnetic, photo-magnetic and photo-emitting properties, their organisation on surfaces, in polymeric films or in sol-gel* (MIUR, **2010-2012**, local budget 70 keuro);
- (*as local coordinator of Modena Research Unit*) FIRB–Accordo ex art. 7 del D.M. 378 del 26/03/04 *Molecular nanomagnets on metallic and magnetic surfaces for applications in molecular spintronics* (MIUR **2012-2014**, local budget 257 keuro);
- (*as tutor*) *Electronic Conduction Devices Based on Molecular Nanomagnets* (one-year post-doctoral research grant funded by Fondazione Cassa di

Risparmio di Modena, **2005-2006**, budget 18 keuro);

• (*as tutor*) *Organization of Single Molecule Magnets on Metal Surfaces* (two-years post-doctoral research grant funded at 50% by INSTM, **2005-2007**, budget 18 keuro);

• (*as tutor*) *Synthesis, structural and magnetic characterization of molecular nanomagnets* (one-year research and training grant funded at 50% by INSTM, **2010-2011**, budget 9 keuro);

• (*as tutor*) *Synthesis of functionalized molecular nanomagnets* (one-year post-doctoral research grant funded at 50% by INSTM, **2011-2012**, budget 11 keuro).

Congress organization: • member of the local organizing committee of *ICMM2008 – XI International Conference on Molecule-based Magnets*, Florence, September 21-24, 2008.

• co-chairman (with M. Yamashita) of the Microsymposium on *Electric and magnetic properties of molecular crystals* at *IUCr 2008, XXI Congress of the International Union of Crystallography*, Osaka (Japan), August 23-31, 2008.

• co-chairman (with B. Sieklucka) of the Microsymposium on *Magneto-structural relationships in molecular compounds* at *IUCr 2014, XXIII Congress and General Assembly of the International Union of Crystallography*, Montreal (Canada), August 5-12, 2014.

INVITED LECTURES

1995
Department of Chemistry, University of Antwerp, Antwerp (Belgium), May 11.
Department of Chemistry, University of Modena, Modena (Italy), May 16.
Department of Chemistry, University of Venice, Venice (Italy), June 9.
1996
Department of Physics, University of Modena, Modena (Italy), May 29.
1997
Department of Chemistry, University of Modena, Modena (Italy), June 12.
Department of Chemistry, University of Modena, Modena (Italy), June 19.
Phase Transitions and Critical Phenomena, Poznan (Poland), December 4–6.
1999
Iowa State University, Ames (USA), October 22.
2000
CERC3 Young Chemists' Workshop *Magnetochemistry – Molecular Magnets*, Florence (Italy), April 15–18.
2002
Tutorial of the MOLNANOMAG Network *Synthetic Strategies for New Spin Topologies*, Paris (France), March 7–9.
Advanced Workshop ESF Programme Molecular Magnets S*ynthetic Approaches to Molecular Magnets – Chemical Tools and New Trends,* Dourdan, Paris (France), April 6–10.
GHMFL Users' Meeting, Grenoble (France), September 21.
Comite d'Evaluation du LCMI, Grenoble (France), December 2–3.
MOLNANOMAG Meeting 3, Manchester (UK), December 13–15.
2004
Xth National School on Materials Science, Sestri Levante (Italy), September 27– October 8.
Perspectives on Single-Molecule Magnets and Single-Chain Magnets (Preconference of ICMM2004), Tsukuba (Japan), October 4.
2005
Workshop on X-ray Diffraction, Modena (Italy), January 13–14.
Manipulating Quantum Spins and Classical Dots, Les Houches (France), April 26–29.
Workshop-School on *STM, AFM and SNOM techniques*, QueMolNa Network, Florence

(Italy), May 6–7.
Spring School *Nanomagnetism and Spintronics*, Cargese (France), May 24 – June 3.
Colloquium *Science in High Magnetic Fields*, Grenoble (France), June 13-14.
Neutrons and Magnetism: from Fundamental Interactions to New Applications, Sirolo (Italy), June 27-29.
Workshop *Physical Phenomena in High Magnetic Fields – V*, Tallahassee (USA), August 5-9.
362nd Wilhelm- and Else-Heraeus Seminar "Advances and Prospects in Molecular Magnetism", Bad Honnef (Germany), November 13-16.
SAMIC2005, Bressanone (BZ), December 4-7.

2006

International Conference on *Single-Molecule Quantum Magnets and Single-Chain Quantum Magnets*, Okazaki, Aichi (Japan), March 11-13.
Coma-Ruga 2006, 2nd International Workshop on Nanomagnetism, Costa Daurada (Spain), July 2-6.
XXII National Congress of Italian Chemical Society (Nasini Lecture) Florence, September 10-15.

2008

MAGMANet Workshop *Towards devices: assembling and addressing molecular nanomagnets*, Huesca (Spain), September 3-4.
ESF Workshop *"Magnetism at Surfaces"*, Baden Baden (Germany), September 28 – October 1.
First European School on Molecular Nanoscience, Gandía (Spain), October 26-31.

2009

2nd International Summer School of the SFB/TRR21 "Control of Quantum Correlations in Tailored Matter", Heinrich-Fabri-Haus, Blaubeuren (Germany), September 22-24.
Nanoscience and Nanotechnology 2009 (n&n09), INFN–Laboratori Nazionali di Frascati, Frascati, October 19-22.
"*EuroMagNET II User Meeting"*, Nijmegen (The Netherlands), October 30.

2010

Universitè Joseph Fourier, Grenoble (France), July 1.
ICMM2010 – The 12th International Conference of Molecule-Based Magnets, Beijing (China), October 8-12.

2011

International Symposium Deposition and Characterization of Nanomagnets on Surfaces *in conjunction with the Young Researchers' Symposium of the DFG Research Unit* Nanomagnets *FOR945,* Bielefeld (Germany), January 25-26.
First EuCheMS Inorganic Chemistry Conference (EICC-1), University of Manchester, Manchester (UK), April 11-14.
The European School on Magnetism, Targoviste (Romania), August 22 – September 2.

2012

62nd Fujihara Seminar *Frontier and Perspectives in Molecule-Based Quantum Magnets*, Sendai (Japan), May 7–10.
Workshop on Contacts to and within Molecules, LexI Cluster of Excellence on "Nanospintronics", Universität Hamburg, Hamburg (Germany), September 19–20.
University of Stuttgart, Stuttgart (Germany), October 23.
Bilateral Workshop on Nanostructured Materials for Magnetic and Spintronic Devices, Embassy of Italy, Canberra (Australia), October 31 ottobre – November 1.

2013

University of Trieste, January 23.
Institut für Chemie, TU Chemnitz, Chemnitz (Germany), October 17 (*GdCh Lecture*).
6th Scientific Workshop "Towards Molecular Spintronics", DFG Research Unit 1154, Chemnitz (Germany), October 17-18.

2014

Workshop *Nanochemistry for Physicists*, Lorentz Center@Snellius, Leiden (The Netherlands), March 10-13.
DPG-Frühjahrstagung 2014 (DPG Sping Meeting) of the Condensed Matter Section (SKM), Dresden (Germany), March 30 – April 4.

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TEACHING ACTIVITY

Courses delivered: Magnetochemistry, Physical Methods in Inorganic Chemistry, Bioinorganic Chemistry, Advanced Inorganic Materials, Chemistry Lab, Inorganic Chemistry Lab, Crystallochemistry, Structure Determination by X-Ray Crystallography, Advanced Inorganic Chemistry, Chemistry, Exercises and Complements of Chemistry (first- and second-level degrees and doctorate courses, SSD CHIM/03).

a.a. 2000-2001 **Bioinorganic Chemistry** (26h, FS), **Inorganic Chemistry Lab II** (module B, 40h, FS); **General Chemistry** (15 h, SSIS); **Physical Chemistry of Materials** (module on magnetic properties, 5h, FS);

a.a. 2001-2002 **Inorganic Chemistry Lab II** (100h, FS);

a.a. 2002-2003 **Inorganic Chemistry Lab II** (100h, FS); **Magnetochemistry** (6h, DC);

a.a. 2003-2004 **Chemistry Laboratory** (module A: General and Inorganic Chemistry, 60h, FS), **Physical Methods in Inorganic Chemistry** (40h, FE&FS), **Advanced Inorganic Materials** (20h, FS), **Magnetochemistry** (6h, DC);

a.a. 2004-2005 **Chemistry Laboratory** (module A: General and Inorganic Chemistry, 60h, FB), **Physical Methods in Inorganic Chemistry** (40h, FE&FS), **Advanced Inorganic Materials** (30h, FS), **Crystallochemistry** (module A: Single-Crystal Methods, 20h, FS); **Structure Determination by X-Ray Crystallography** (6h, DC);

a.a. 2005-2006 **Chemistry Laboratory** (module A: General and Inorganic Chemistry, 36h, FB), **Physical Methods in Inorganic Chemistry** (40h, FE&FS), **Inorganic Chemistry II** (module A, 30h, FS), **Crystallochemistry** (module A: Single-Crystal Methods, 20h, FS);

a.a. 2006-2007 **Chemistry Laboratory** (module A: General and Inorganic Chemistry, 36h, FB), **Physical Methods in Inorganic Chemistry** (40h, FE&FS), **Inorganic Chemistry II** (module A, 30h, FS), **Crystallochemistry** (module A: Single-Crystal Methods, 20h, FS);

a.a. 2007-2008 **Chemistry Laboratory** (module A: General and Inorganic Chemistry, 36h, FB), **Physical Methods in Inorganic Chemistry** (40h, FE&FS), **Inorganic Chemistry II** (module A+C, 78h, FS), **Crystallochemistry** (module A: Single-Crystal Methods, 20h, FS).

a.a. 2008-2009 **Advanced Inorganic Chemistry** (122h, FS), **Chemistry** (48h, FS)

a.a. 2009-2010 **Advanced Inorganic Chemistry** (122h, FS)

a.a. 2010-2011 **Advanced Inorganic Chemistry** (122h, FS), **Chemistry** (48h, FS)

a.a. 2011-2012 **Advanced Inorganic Chemistry** (122h, FS), **Chemistry** (48h, FS)

a.a. 2012-2013 **Advanced Inorganic Chemistry** (114h, DSCG), **Chemistry** (48h, FIM)

a.a. 2013-2014 **Advanced Inorganic Chemistry** (48h, DSCG), **Chemistry** (48h, FIM), **Exercises and Complements of Chemistry** (24 h, DSCG)

Abbreviations: FS = Faculty of Mathematical, Physical and Natural Sciences; FB = Faculty of

Biosciences and Biotechnologies; FE = Faculty of Engineering; DC = Doctorate in Chemistry; SSIS = Scuola di Specializzazione per l'Insegnamento Secondario; DSCG = Department of Chemical and Geological Sciences; FIM = Department of Physics, Informatics and Mathematics.

TRAINING ACTIVITY

Andrea Cornia has supervised several degree and doctorate theses in the field of inorganic and coordination chemistry, molecular magnetism and surface science. He has been the supervisor of many post-graduate and post-doctoral activities covered by MIUR through PRIN and FIRB projects, by EU or by other sources (INSTM, Fondazione Cassa di Risparmio di Modena).

OTHER ACTIVITIES

Andrea Cornia has been member of both national (Florence, Parma) and international (Antwerp, Paris-Orsay, Delft) PhD juries and of evaluation panels for the recruitment of post-doctoral fellows. Since October 2013 he is President of the Commission for Research and Development of the Department of Chemical and Geological Sciences.

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LIST OF PUBLICATIONS

1. L. Antolini, A. Cornia, A. C. Fabretti, L. Schenetti, **Synthesis, Crystal and Molecular Structure, and Spectroscopic Characterization of 5–(1–Hydroxycyclohexylthio)–1,3,4–thiadiazole–2–thione**, *J. Chem. Soc. Perkin Trans. 2* **1993**, 417–420.

2. A. Cornia, U. Folli, S. Sbardellati, F. Taddei, **Electron Transfer in the Reactions of Organic Trichloromethyl Derivatives with Iron(II) Chloride**, *J. Chem. Soc. Perkin Trans. 2* **1993**, 1847–1853.

3. A. Cornia, A. C. Fabretti, A. Giusti, F. Ferraro, D. Gatteschi, **Molecular Structure and Magnetic Properties of Copper(II), Manganese(II) and Iron(II) Croconate Trihydrate**, *Inorg. Chim. Acta* **1993**, *212*, 87–94.

4. A. Cornia, A. C. Fabretti, F. Ferraro, D. Gatteschi, A. Giusti, **Magnetic Properties and Crystal Structure of a Linear–chain Copper(II) Compound with Bridging Chloride and Oxamidate Ligands**, *J. Chem. Soc. Dalton Trans.* **1993**, 3363–3366.

5. L. Antolini, A. Cornia, A. C. Fabretti, W. Malavasi, **Synthesis, Crystal and Molecular Structure, and Infrared Characterization of Two Amino Derivatives of 1,3,4–Thiadiazole**, *J. Crystallogr. Spectrosc. Res.* **1993**, *23*, 967–971.

6. A. Cornia, D. Gatteschi, K. Hegetschweiler, **Magnetic Exchange Coupling in the $Fe_6^{III}(\mu_6–O)$ Core: A Hint to the Magnetic Properties of Higher–Nuclearity Spin Clusters**, *Inorg. Chem.* **1994**, *33*, 1559–1561.

7. A. Cornia, A. C. Fabretti, R. Grandi, W. Malavasi, **Structure of *catena*–(2–Amino–1,3,4–Thiadiazolium, 2–Amino–1,3,4–Thiadiazole bis(μ–Iodo)–di–Iodo–Bismuth(III))**, *J. Chem. Crystallogr.* **1994**, *24*, 277–280.

8. A. Cornia, A. C. Fabretti, A. Giusti, F. Ferraro, D. Gatteschi, **Magnetic Properties and Crystal Structure of a Linear–Chain Copper(II) Compound with Bridging Chloride and Oxamidate Ligands**, in *Syntheses and Methodologies in Inorganic Chemistry – New Compounds and Materials*; Ed. S. Daolio, E. Tondello, P. A. Vigato; **1994**, *4*, 220–224.

9. A. Caneschi, A. Cornia, S. J. Lippard, **A Cyclic Hexairon(III) Complex with an Octahedrally Coordinated Sodium Ion at the Center, an Example of the [12]Metallacrown–6 Structure Type**, *Angew. Chem.* **1995**, *107*, 511–513; *Angew. Chem. Int. Ed. Engl.* **1995**, *34*, 467–469 (*cover*).

10. A. Caneschi, A. Cornia, A. C. Fabretti, D. Gatteschi, W. Malavasi, **Polyiron(III)–Alkoxo Clusters: A Novel Trinuclear Complex and Its Relevance to the Extended Lattices of Iron Oxides and Hydroxides**, *Inorg. Chem.* **1995**, *34*, 4660–4668.

11. A. Cornia, A. C. Fabretti, D. Gatteschi, G. Pályi, E. Rentschler, O. I. Shchegolikhina, A. A. Zhdanov, **Molecule–based Magnets: Ferro– and Antiferromagnetic Interactions in Nickel(II)–Cyclohexasiloxanolate Sandwich Complexes**, *Inorg. Chem.* **1995**, *34*, 5383–5387.

12. A. Caneschi, A. Cornia, A. C. Fabretti, D. Gatteschi, **Structure and Magnetic Properties of a Decanuclear Oxoiron(III) Cluster: A Further Step to Understanding Iron Aggregation Processes**, *Angew. Chem.* **1995**, *107*, 2862–2864; *Angew. Chem. Int. Ed. Engl.* **1995**, *34*, 2716–2718.

13. A. Caneschi, A. Cornia, A. C. Fabretti, D. Gatteschi, R. Grandi, F. Le Gall, S. J. Lippard, W. Malavasi, L. Schenetti, **Polyiron(III)–Alkoxo Clusters**, in *Syntheses and Methodologies in Inorganic Chemistry – New Compounds and Materials*; Ed. S. Daolio, E. Tondello, P. A. Vigato; **1995**, *5*, 391–395.

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14. A. Caneschi, A. Cornia, S. J. Lippard, G. C. Papaefthymiou, R. Sessoli, **Magnetic Properties of Dodecanuclear Mixed Valence Iron Clusters**, *Inorg. Chim. Acta, Special Issue* **1996**, *243*, 295–304.

15. C. Zucchi, O. I. Shchegolikhina, M. Borsari, A. Cornia, G. Gavioli, A. C. Fabretti, E. Rentschler, D. Gatteschi, R. Ugo, R. Psaro, Yu. A. Pozdniakova, S. V. Lindeman, A. A. Zhdanov, G. Pályi, **Cyclooligosiloxanolate Cluster Complexes of Transition Metals and Lanthanides**, *J. Mol. Catalysis A* **1996**, *107*, 313–321.

16. D. Gatteschi, A. Caneschi, R. Sessoli, A. Cornia, **Magnetism of Large Iron–Oxo Clusters**, *Chem. Soc. Rev.* **1996**, *25*, 101–109.

17. A. Cornia, D. Gatteschi, K. Hegetschweiler, L. Hausherr–Primo, V. Gramlich, **Metal Binding of Polyalcohols. 4. Structure and Magnetism of the Hexanuclear, μ_6–Oxo–centered $[OFe_6(H_{-3}thme)_3(OCH_3)_3Cl_6]^{2-}$ [thme = tris(hydroxymethyl)ethane]**, *Inorg. Chem.* **1996**, *35*, 4414–4419.

18. E. Rentschler, D. Gatteschi, A. Cornia, A. C. Fabretti, A.–L. Barra, O. Shchegolikhina, A. A. Zhdanov, **Molecule–based Magnets: Ferro– and Antiferromagnetic Interactions in Copper(II)–Polyorganosiloxanolate Clusters**, *Inorg. Chem.* **1996**, *35*, 4427–4431.

19. A. Caneschi, A. Cornia, A. C. Fabretti, S. Foner, D. Gatteschi, R. Grandi, L. Schenetti, **Synthesis, Crystal Structure, Magnetism and Magnetic Anisotropy of Cyclic Clusters Comprising Six Iron(III) Ions and Entrapping Alkaline Ions**, *Chem. Eur. J.* **1996**, *2*, 1379–1387.

20. A. Cornia, A. C. Fabretti, R. Grandi, W. Malavasi, L. Schenetti, A. Caneschi, D. Gatteschi, **Iron(III)–Alkoxo Clusters: Structure and Magnetic Properties**, in *Syntheses and Methodologies in Inorganic Chemistry – New Compounds and Materials*; Ed. S. Daolio, E. Tondello, P. A. Vigato; **1996**, *6*, 539–545.

21. A. Cornia, A. C. Fabretti, M. Bonivento, L. Cattalini, **The Bonding of Thiazoles to Platinum(II) Complexes. X–Ray Crystal Structure of *cis*– and *trans*–[Pt(dimethylsulfoxide)(thiazole)Cl_2]**, *Inorg. Chim. Acta* **1997**, *255*, 405–409.

22. A. Lascialfari, D. Gatteschi, F. Borsa, A. Cornia, **Spin Dynamics in Mesoscopic Size Magnetic Systems: a ^{1}H NMR Study in Rings of Iron(III) Ions**, *Phys. Rev. B* **1997**, *55*, 14341–14349.

23. M. Arca, A. Cornia, F. A. Devillanova, A. C. Fabretti, F. Isaia, V. Lippolis, G. Verani, **New Perspectives in Phosphonodithioate Coordination Chemistry. Synthesis and X–Ray Crystal Structure of bis–[*O*–ethyl–(4–methoxyphenyl)phosphonodithioato] nickel(II)**, *Inorg. Chim. Acta* **1997**, *262*, 81–84.

24. F. Le Gall, F. Fabrizi de Biani, A. Caneschi, P. Cinelli, A. Cornia, A. C. Fabretti, D. Gatteschi, **Synthesis, Crystal Structures and Magnetic Characterization of Four β–Diketonate–Alkoxide Iron(III) Dimers. Dependence of the Magnetic Properties on Geometrical and Electronic Parameters**, *Inorg. Chim. Acta* **1997**, *262*, 123–132.

25. A.–L. Barra, D. Gatteschi, R. Sessoli, G. L. Abbati, A. Cornia, A. C. Fabretti, M. G. Uytterhoeven, **Electronic Structure of Manganese(III) Compounds from High Frequency EPR Spectra**, *Angew. Chem.* **1997**, *109*, 2423–2426; *Angew. Chem. Int. Ed. Engl.* **1997**, *36*, 2329–2331.

26. G. L. Abbati, A. Caneschi, A. Cornia, A. C. Fabretti, D. Gatteschi, W. Malavasi, L. Schenetti, **Modulated Magnetic Coupling in Alkoxoiron(III) Rings by Host–Guest Interactions with Alkali Metal Cations**, *Inorg. Chem.* **1997**, *36*, 6443–6446.

27. S. P. Watton, P. Fuhrmann, L. E. Pence, A. Caneschi, A. Cornia, G. L. Abbati, S. J. Lippard, **A Cyclic Octadecairon(III) Complex, the Molecular 18–Wheeler**, *Angew. Chem.* **1997**, *109*, 2917–2919; *Angew. Chem. Int. Ed. Engl.* **1997**, *36*, 2774–2776 (*cover*).

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28. G. L. Abbati, M. Borsari, A. Cornia, A. C. Fabretti, G. Battistuzzi Gavioli, A. Caneschi, D. Gatteschi, **Valence Delocalization in a Heptanuclear Manganese(II,III) Cluster with Six–Fold Molecular Symmetry**, in *Syntheses and Methodologies in Inorganic Chemistry – New Compounds and Materials*; Ed. S. Daolio, E. Tondello, P. A. Vigato; **1997**, *7*, 306–311.

29. A. Lascialfari, D. Gatteschi, A. Cornia, U. Balucani, M. G. Pini, A. Rettori, **Nuclear Spin Relaxation in Magnetic Rings**, *Phys. Rev. B* **1998**, *57*, 1115–1123.

30. G. L. Abbati, A. Cornia, A. C. Fabretti, A. Caneschi, D. Gatteschi, **A Ferromagnetic Ring of Six Manganese(III) Ions with a *S* = 12 Ground State**, *Inorg. Chem.* **1998**, *37*, 1430–1431.

31. A. Caneschi, A. Cornia, A. Dei, **Valence Tautomerism in a Cobalt Complex of a Schiff Base Diquinone Ligand**, *Inorg. Chem.* **1998**, *37*, 3419–3421.

32. A. Lascialfari, Z. H. Jang, F. Borsa, D. Gatteschi, A. Cornia, **Comparison of the Spin Dynamics in Different Types of Molecular Magnetic Rings from ^{1}H NMR**, *J. Appl. Phys.* **1998**, *83*, 6946–6948

33. G. L. Abbati, A. Cornia, A. C. Fabretti, A. Caneschi, D. Gatteschi, **Structure and Magnetic Properties of a Mixed–Valence Heptanuclear Manganese Cluster**, *Inorg. Chem.* **1998**, *37*, 3759–3766.

34. A. Cornia, A. C. Fabretti, G. Gavioli, C. Zucchi, M. Pizzotti, A. Vizi–Orosz, O. I. Shchegolikhina, Yu. A. Pozdniakova, G. Pályi, **Heterobimetallic Cyclosiloxanolate Sandwich Clusters: Na{[η^6–cyclo(PhSiO$_2$)$_6$]$_2$[Fe(OR)]$_2$Ni$_4$(μ_6–Cl)} (R = H, Me)**, *J. Cluster Sci.* **1998**, *9*, 295–319.

35. C. Zucchi, M. Mattioli, A. Cornia, A. C. Fabretti, G. Gavioli, M. Pizzotti, R. Ugo, Yu. A. Pozdniakova, O. I. Shchegolikhina, A. A. Zhdanov, G. Pályi, **Bimetallic Cyclooligosiloxanolate Complexes of Copper and Nickel**, *Inorg. Chim. Acta* **1998**, *280*, 282–287.

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