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SCIENCE DIRECT®
C. R. Chimie 8 (2005) 931–932
COMPTES RENDUS CHIMIE
http://france.elsevier.com/direct/CRAS2C/

Foreword

A tribute to Francis Sécheresse

It is a great pleasure for us to dedicate this volume of the *Comptes rendus Chimie* to Professor Francis Sécheresse, from the University of Versailles–Saint-Quentin, France, on the occasion of his 60th birthday. Francis is the leader of the group in which we have been working for several years.

Professor Francis Sécheresse was born in March 1944 and was brought up in Lannemezan (Principality of Tarbes, France). After his studies of chemistry, he obtained in 1985 his PhD at the University Pierre-et-Marie-Curie (Paris-6, France). In 1986, he became there '*maître de conferences*' and, in 1992, was appointed as full professor of Inorganic Chemistry at the University of Versailles–Saint-Quentin (France), where he actively manages a research team internationally renowned in the field of polyoxo(thio)metallate chemistry. During his career, Professor Francis Sécheresse approached a large diversity of sophisticated challenges, bringing relevant contributions for each domain.

He obtained the chemistry prize of the coordination chemistry division ('Société française de chimie', 1987) and, furthermore, he has been a member of the European Academy of Sciences since 2002. Francis Sécheresse has published more than 100 articles and several reviews in the most prestigious specialized journals.

Currently, the main areas of interest of Francis Sécheresse cover the following domains:

- inorganic thiochemistry, focused mainly on the activation of tetrathiometallates by functionalized organic compounds;
- inorganic supramolecular chemistry oriented toward the self assembly of polyoxo(thio)metallate or metallic nanoparticles;
- catalysis materials for industrial applications (alkanes oxidation and hydrodesulphurization processes).

Francis Sécheresse pioneered preparative and structural chemistry of sulfido complexes, isopolythioanions issued from acidification processes of $[WS_4]^{2-}$. The tetranuclear $[W_4S_{12}]^{2-}$ ion is one of the most significant results of this period. Mechanistic investigations by the 'trapping method' have been successfully undertaken for the understanding of the vigorous internal redox transfers that occur during condensation processes. Francis Sécheresse and co-workers demonstrated the richness of such a chemistry by a creative and productive development based on the unusual reactivity of the $[MS_4]^{2-}$ ions (M = W, Mo). The achievement of this work can be weighed up with heterobimetallic cubane-like clusters or organic–inorganic hybrid molecular compounds, based on archetypical metal–sulfido complexes. Nevertheless, Francis Sécheresse and his co-workers succeeded in combining the polyoxometallate and thiometallate chemistry. For a long time, both domains (POM and THIO) were clearly separated and many chemists have tried without success to introduce sulfur in the Keggin anion. They achieved this performance using a preformed metal–sulfur building unit $\{Mo_2O_2S_2\}$, highly reactive toward lacunar polyoxotungstates. The first sulfur atoms in the Keggin ions originated a fascinating series of multi-unit compounds, exhibiting dynamic and supramolecular properties. Additionally, Francis Sécheresse and his co-workers successfully applied the general condensation principles to the $\{Mo_2O_2S_2\}$ synthon. Thus, a series of unprecedented inorganic rings based on the $\{Mo_2O_2S_2\}$ enchainment was discovered. Varying in size and shape, the inorganic rings exhibit dynamic host–guest properties of particular interest for the development of a specific supramolecular cycle-based chemistry. Professor Francis Sécheresse and his co-workers have now got a strong renown in the field of polyoxometallates. An important step was clearly achieved by the use of N_3^- as exogen ligands in the aggregation processes, for handling highly complex metal clusters based on multi-unit assembly (magnetochemistry). Furthermore, Fran-

1631-0748/$ - see front matter © 2005 Published by Elsevier SAS on behalf of Académie des sciences.
doi:10.1016/j.crci.2005.03.004

cis Sécheresse and co-workers turned the concept of the 'hierarchical building-block assembly' to account. They described the formation of some extended molecular networks, in which the reduced ϵ-Keggin anion can be used to form chains, layered bi-dimensional structures or three-dimensional arrangements. Recently, he approached the field of the nanochemistry by the use of functionalized polyoxoanions as surfactants for the size-controlled growth of metallic particles.

This story has not come to an end, and surely, many good things will come in the future, in particular, the magnetochemistry of ferromagnetic multi-unit POMs, or biological applications of some thiometallates as antitumoral agent, or physical developments of the POM-functionalized particles for optical applications. Professor Francis Sécheresse works in a large interdisciplinary level and for the future, we may expect some fundamentally new insights into the polyoxo- and thiometallate domains.

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