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Editorial

In this and a subsequent issue, we are honoring the creative spirit of the 2011 winner of the ACS Award for Creative Work in Fluorine Chemistry, Professor Alain Tressaud, and the contributions he has made to the field of Inorganic Fluorine Chemistry. Owing to the overwhelming response to the Editors' solicitation for an issue honoring Alain, two issues of the *Journal of Fluorine Chemistry* will appear in his honor. Most of the papers included in these special issues are from the laboratories of the invited lecturers who participated in a special award symposium.[1] However, many were submitted by others who wished to acknowledge the achievements of their friend and colleague. The centerpiece of this issue is a review article by Alain Tressaud "Structural Architecture and Physical Properties of Some Inorganic Fluoride Series".

Alain Tressaud's ACS award specifically recognizes the major contributions he has made to the field of solid-state fluorine chemistry, in particular for correlations between structure and properties. He has discovered numerous new series of fluorides and oxide-fluorides and has elucidated the correlations between structural features and their physico-chemical properties. He has published more than 350 papers in international journals and holds 12 international patents and has participated in cooperative programs involving 12 different countries which have led to more than 130 joint papers. Alain has edited five books and has been the guest-editor of six special issues of international journals, all devoted to major aspects of fluorine chemistry. His last two books as editor: "*Fluorine & Health*" (with G. Haufe) and "*Functionalized Inorganic Fluorides*" were published by Elsevier and Wiley, respectively, in 2008 and 2010.

Alain Tressaud's investigations on solid-state fluorine chemistry began nearly forty-five years ago when he joined the Solid State Chemistry Laboratory of Bordeaux University, created and directed by Professor Paul Hagenmuller. In 1972, he spent his post-doctoral stay, as a NATO fellow, at UC Berkeley, in Professor Neil Bartlett's group, which initiated a friendly and very fruitful cooperation that lasted until Neil's sudden death in 2008. Alain Tressaud, a Research Director at the CNRS, was, until 2009, the Head of the "*Fluorine & Fluoride Materials Group*" at ICMCB-CNRS. Since that time, he has actively continued, as Emeritus, to follow with great interest the results obtained at ICMCB by his colleague Alain Demourgues, now in charge of the Bordeaux Fluorine Group. Alain Tressaud is still involved in national and international projects on fluorine chemistry, such as the scientific program of the French Fluorine Network and the organization of international conferences in France (17-ESFC), India (1st-IISFC), and Russia (ISIF series). He enjoy editing and writing books, the most recent, "*Le fluor: histoire, applications et paradoxes*", appeared in March 2011 and was published by CNRS-Editions.

Besides his scientific interests, he has many other hobbies in a variety of fields, such as Japanese woodblock prints in e-hon, gafu or toba-e, the latest prehistorical discoveries, particularly those in the region of his birth, "le Périgord", and urban culture which blossoms worldwide in the form of murals and street art.

Among the important breakthroughs achieved by Alain, which have brought him international recognition are:

The discovery of high or unusual oxidation states among the d-transition elements: e.g. Ni^{3+}, Cu^{3+}, Pd^{3+} in cryolite-type phases, and $Co^{4+}$and Cu^{4+} in K_2PtCl_6-type compounds. In the majority of these compounds, he was able to correlate the stabilization of the oxidation state with the reticular energy of the network, and/or the presence of competitive bonding. In mixed-valency palladium fluoride Pd_2F_6, he gave evidence and explained the highest jumps of electrical conductivity under high pressure ever observed in a fluorine compound. Many of these investigations were, in fact, carried out in collaboration with Neil Bartlett, who discovered noble-gas reactivity nearly 50 years ago. These collaborations with the Bordeaux research group spanned more than 30 years.

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Most families of ferrimagnetic and ferromagnetic fluorides were discovered and characterized by his research team, i.e., weberite-, chiolite-, and perovskite-derived phases. Fluoro-magnets with the highest Curie temperatures were observed in Bordeaux, e.g., Na_2NiCoF_7 a fluoro-ferrimagnet and $NiMnF_6$, a fluoro-ferromagnet. In 1990, Alain also discovered, in cooperation with his colleague B. Chevalier, that high-T_C superconductivity could be induced in a La_2CuO_4-insulator by low-temperature intercalation of F^- ions.

In the fields of graphite intercalation compounds and carbon–fluorine systems, Alain elucidated fundamental aspects of intercalation processes in terms of charge transfer and the electronic configurations of guest species. Two examples illustrate the potential applications of such materials: (1) in the field of metallic conductors, fluorine-intercalated graphite fibers with conductivity values approaching that of copper, (2) in the domain of energy storage, Li-ion batteries with highly improved capacity after rf plasma fluorination of the carbon anode (a collaboration with T. Nakajima and H. Touhara, Japan and with H. Groult, UPMC, Paris).

Most recently, Alain's interests have also been focused on mixed-anion compounds and their applications: porous alumina with switchable properties for offset processing, new catalysts for the syntheses of chlorofluorocarbon substitutes, non-toxic red or yellow pigments, UV absorbers for the protection of wood, secured chemical storage and delivery of fluorine.

Important aspects of Alain's personality are his charisma and enthusiasm which have helped him to associate scientists and create long-term scientific exchanges. He developed many international scientific collaborations at various levels:

In France:

- Creation and management of the French Fluorine Network supported by the CNRS.
- Scientific coordination of annual transdisciplinary seminars on fluorine and fluorocompounds.
- National commemoration of the centenary of Henri Moissan's Nobel prize (2006).

In Europe:

- French leadership of the European program devoted to fluoride materials.
- Organization of the 13th European Symposium on Fluorine Chemistry in Bordeaux (2001).

Launching worldwide international programs:

- France–Japan seminars on inorganic fluorine chemistry and electrochemistry with JSPS (since 1993).
- France–Slovenia Proteus programme with the Jožef Stefan Institute (1990–2000).
- International Seminars on Advanced Inorganic Fluorides with Russian Academy of Sciences (since 2003).

He has been an "Associate Scientist" of the Jožef Stefan Institute, Ljubljana, Slovenia since 1998, and was elected in 2007 at the "*European Academy of Sciences*", Belgium, and at the "*Academia Scientiarum et Artium Europæa*", Austria, in 2009. In 2008, he received the "*Grand Prix CEA* (*Atomic Energy Agency*)" of the French Academy of Sciences.

Mixing a deep scientific culture with an astute sense for practical applications, Alain Tressaud has made exceptional contributions to research areas as different as magnetism, superconductivity, optical properties, ionic conductivity for advanced batteries and surface chemistry. On behalf of his many scientific colleagues and friends I congratulate him.

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