

To Professor Gérard Demazeau on the Occasion of his 65th Birthday



Gérard Demazeau was born in St-Pierre les Eglises (near Chauvigny, Vienne) on June 7th, 1943. He studied chemistry at the University of Poitiers and received the *Lauréat de la Faculté des Sciences* in 1967. In the same year, Gérard joined the *Laboratoire de Chimie du Solide* in Bordeaux where Professor Paul Hagenmuller offered him the opportunity to obtain his thesis in the field of preparative high-pressure chemistry. In December 1969, Gérard defended his *Thèse de 3^{ième} Cycle* with the title *Réalisation d'une unité de haute pression en milieu fluide. Application à la synthèse de nouveaux composés oxyfluorés et hydroxyfluorés*. He continued research in solid-state chemistry and completed a *Thèse de Doctorat d'Etat* in October 1973 entitled *Réalisation de hautes pressions d'oxygène. Préparation et étude physique de nouveaux composés oxygénés du cobalt, du nickel et du cuivre au degré d'oxydation +III*. While carrying out his doctoral research, Gérard was already engaged in teaching at the University of Bordeaux I as a *Maître Assistant Stagiaire*. In 1978 he was appointed *Maître de Conférences*, he became a full professor in 1979, and a *Professeur de Classe Exceptionnelle – 1^{er} échelon*

in October 1996. Gérard was awarded the *Prix Paul Pascal de l'Académie des Sciences* in 1986 and *Chevalier dans l'ordre des Palmes Académiques* in 1996, in recognition of his contributions to teaching and research. In addition, Gérard has accepted many varied administrative duties for the University of Bordeaux I.

Gérard created an internationally respected high-pressure research group which recently became the *Centre de Ressources Hautes Pressions* within the *Institut de Chimie de la Matière Condensée de Bordeaux* (the former *Laboratoire de Chimie du Solide – LCS*). With his colleagues and many external collaborators, Gérard's research has ranged broadly across the field of high-pressure science, including solid-state chemistry, materials science, geosciences, biosciences, and environmental studies. The laboratory acquired a corresponding variety of technical facilities, ranging from autoclaves for reactions in fluids (aqueous solutions, hydrogen fluoride, liquid ammonia, hydrazine and oxygen gas), a Belt, a hexaeder press and diamond anvil cells, to pilot equipment for high-pressure food treatment.

G rard's principal research topic in the field of solid-state chemistry was the stabilization of unusual, high oxidation states of transition metals under high-pressure conditions and the investigation of their electronic and magnetic properties. Prominent examples are the synthesis of novel perovskite-related phases such as LaCuO_3 , and the rare earth nickelates RENiO_3 , TiNiO_3 , and LaPdO_3 . Other projects included work on magnetic pigments based on chromium dioxide and Fe_4N . Many of these new materials were doped with M ssbauer-active nuclei for spectroscopic characterization. More than 100 publications resulted from these transition-metal projects. The Demazeau group also synthesized a novel family of high-pressure phyllosiloxides and new compounds of light elements, with a particular focus on carbon nitride, C_3N_4 . Phase transformations in geochemically relevant materials were also studied.

An equally important theme of G rard's research has been the investigation of solvo- and hydro-thermal reactions to grow crystals and to understand crystallization processes under high-pressure conditions. Important examples are the flux growth of diamond, gallium nitride, cubic boron nitride and the piezoelectric α -quartz, SiO_2 . The reduction of crystal defects was a particularly important task for the application of the latter material in high-frequency devices, and G rard worked closely with industrial partners on several technological projects.

The biosciences research concerned the conservation of food and the destruction of pathogenic micro-organisms using high pressures at mild temperatures (sometimes referred to as 'Pascalization'). *Sauternes* (sweet white wine) and *Foie gras* were among many foodstuffs conserved in a pilot project at Bordeaux.

G rard's broad, interdisciplinary approach to science has resulted in almost 500 scientific publications

to date. He has also supervised 49 doctoral theses, several *en cotutelle* through many external collaborations in France and beyond. His passion for science, his receptiveness and chemical creativity gave rise to many of these collaborations when he was visiting high-pressure and solid-state chemistry laboratories around the world.

The scientific contribution of G rard Demazeau is not only measured by his research output, but also by his engagement in creating local, national, and international networks for teaching and research. He has organized several high-pressure and materials-science research summer schools for doctoral students, and he coordinated the Pierre Duhem seminar from 1994 to 1997. In 1990 and 2003, he organized the combined European (EHPRG) and International (AIRAPT) high-pressure conferences in Bordeaux, both attracting more than 300 participants. G rard has also recently directed a European Science Foundation COST D30 network on *High Pressures in Materials Chemistry*, to promote the future of high-pressure materials synthesis by linking laboratories in Germany, Spain, and the UK with Bordeaux.

G rard is also an oenophile and a distinguished expert in Bordeaux wines. His other hobbies are cooking and gardening, especially in the summer residence at *La Teste* in the *Bassin d'Arcachon*, where Colette and G rard spend many weekends and holidays. There they have hosted many excellent dinners enjoyed by friends and colleagues from around the world.

G rard, we wish you a happy birthday, good health, and continuing scientific creativity for the years to come.

J. Paul Attfield, Hubert Huppertz, and Rainer P ttgen,
Edinburgh, M nchen, and M nster, June 2008.