Marie-Paule BASSEZ update: 16 November 2026
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https://scanr.enseignementsup-recherche.gouv.fr/person/idref187853452
https://orcid.org/0000-0002-7548-8894

Functions * Full **UNIVERSITY PROFESSOR** since 01 October 1985 (1rst class in 2000)
University of Strasbourg, Institute of Technology; 2018: Jean-Marie Lehn Foundation, Fr.
* ADJUNCT PROFESSOR (summer 1990, 1991 and 1992)
Texas Tech University, Lubbock, TX, USA.
* GUEST LECTURER (1995 et 1996)
International Space University, Strasbourg_Illkirch-Graffenstaden, Fr.
* GUEST EDITOR (09/2008-08/2009) for the volume "Origin of Life" of the
Open Access "International Journal of Molecular Sciences" IJMS.

DIPLÔMES

12 October 1981: "Doctorat d'Etat" n° 2498, Université de **Paris-Sud**, centre d'**Orsay**
DOCTEUR ès SCIENCES specialty **PHYSICAL SCIENCES (CHEMISTRY)**
« Spectroscopic Study of Glycine and some Related Molecules. Rotational Analysis and Observations of the Interstellar Medium. Etude spectrochimique de la glycine et de quelques molécules connexes. Analyse rotationnelle et observations du milieu interstellaire »
This pluridisciplinary thesis has been submitted without research director and with two principal examiners: R. Wertheimer for the microwave spectroscopy results and J. Lequeux for the radioastronomy results. The research work was completed in Australia and in the United States.
The examiners are French: Rose MARX and Jean FAURE (**Orsay**, **Physical-Chemists**)
Raymond WERTHEIMER (**Lille**) and Alain OMONT (**Grenoble**) (**Physicians)**
James LEQUEUX (Observatoire de **Paris**-Meudon) and Michel GUELIN (**Grenoble**) (**Astronomers**).
The results of this thesis are entirely independent of the 1971 Ph.D. thesis.

July 1980: **DOCTOR of PHILOSOPHY**, Ph.D., **PHYSICAL SCIENCES (CHEMISTRY)**
« Microwave Spectroscopy and Radioastronomy of Glycine and Related Molecules»
The experiments were conducted in the laboratory of Professor Ron D. Brown, in **Monash** University, Clayton, **Melbourne, Australia**, and considered as a post-doctorate. My goal was a French "doctorat d'état" and on the way I wrote a PhD thesis which was examined by American scientists: William D. GWINN, **University of California, Berkeley** and Patrick THADDEUS, **Goddard Institute for Space Studies, NASA, New-York.** As a consequence, Pr. P. Thaddeus proposed that I work in his laboratory.

30 June 1971: **DOCTOR** specialty **PHYSICAL CHEMISTRY: SPECTROSCOPY**
« Contribution to the study of the reactions of active nitrogen with elements of the group VI B, by spectroscopy of electronic transitions and by electron paramagnetic resonance. Contribution à l'étude par spectroscopie électronique et résonance paramagnétique électronique des réactions de l'azote activé sur des éléments du groupe VI B *»*
Univ. Sciences et Techniques **Lille-1, Fr.** Examiners: M. BECART, P. GOUDMAND, M. DELHAYE

June 1969: Mémoire, **DISSERTATION,** for the Diplôme d'Etudes Approfondies, DEA, de CHIMIE-PHYSIQUE-PHOTOCHIMIE, **PHYSICAL CHEMISTRY-PHOTOCHEMISTRY,**
« Etude des Radicaux libres par spectroscopie optique et spectroscopie des radiofréquences »
Univ. Sciences et Techn. **Lille-1, Fr.** Examiners: M.GOUDMAND, O.DESSAUX, C.LOUCHEUX
Sept.1968: **MAÎTRISE** de **Chimie-Physique**
June 1966: **PROPEDEUTIQUE: Mathématiques, Physique, Chimie**
Université des Sciences et Techniques de **Lille-1**, **Fr**ance

"La véritable industrie ne consiste pas à exécuter avec tous les moyens connus et donnés. L'art, le génie est d'accomplir en dépit des difficultés et de trouver par-là peu ou point d'impossible." Las Cases 1801

SCIENTIFIC RESEARCH PRODUCTION

ARTICLES and BOOKS
*** means published in International Journals with Reviewers, or with DOI**
ORAL & POSTER PRESENTATIONS,
GEOLOGICAL TERRAINS
DIRECTIONS, SCIENTIFIC ORGANIZATIONS

- **48 Research articles*** with international peer-reviewers, or DOI numbers, including 29 with only one author: M.P. Bassez.

The research focuses on the origins of life.

Initially, spectroscopic studies of diatomic molecules and rotational analyses of more complex molecules such as glycine, led to radioastronomical observations of molecular clouds in our galaxy, with the purpose to investigate the possible **extraterrestrial origins of life**. Attention then turned to the structure of liquid water, an essential component of life.

Since 1997, emphasis has been placed on the structure of water under high pressure, the oxidation of ferrous iron through electron transfer in anoxic, high-subcritical water, and the synthesis of prebiotic molecules within mineral inclusions. These investigations led to the introduction, in 2016, of the concept of **geobiotropy**, describing the role of terrestrial and extraterrestrial minerals acting as reactants in prebiotic chemistry.

In 2026, the complementary concept of **biogeotropy** was introduced to describe the limits of life through the oxidative decomposition of living cells and their transformation into carbonated rocks, involving electron transfer mediated by the semi-conductor anatase.

Together, geobiotropy and biogeotropy describe two complementary processes linking the mineral and living worlds, from the synthesis of molecules of life to their return to mineral matter.

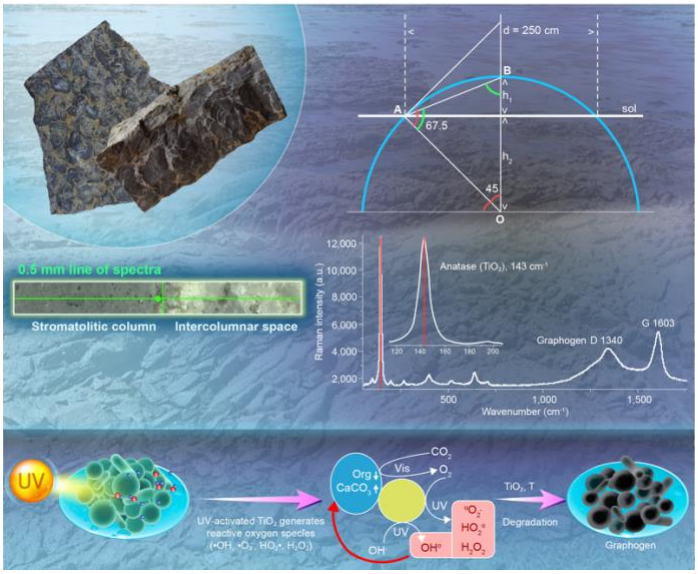
17 Research and didactic **documents** published with no committee of peer-reviewers.
Within these 17 articles, 16 are published with only one author: M.P. Bassez.

- **49 Communications** in **International conferences, workshops and seminars**
- **15 Communications** in **national French conferences, workshops and seminars**
- **08 Softwares, Computer-Based Training and Didactic Publications**
- **Books:** 1 e-Book, 1 volume of a Journal, 6 *cyber*Books:
  - Author and publisher of the *e-book* "*Chemphys*" (n°111)
  - Editor of 23 articles published in the special volume "*Origin of Life"* for the International Journal of Molecular Sciences, IJMS, ISSN 1422-0067 (n°78*)
  - Director, Author and Publisher of the *cyber*Book, "*Life, Origins and Diversity"* (n°72)
  - Author and Publisher of the two *cyber*Books, "*Physical Chemistry*" (n°63) and
  - "*Instrumental Analysis*" (n°55)
  - Editor and Publisher of the three *cyber*books *"A Sustainable Earth"* (n°68), *"Atoms, Energy and Kinetics"* (n°62), *"Professional Chemistry"* (n°54)
- **Pioneer** in 1998 for the opening of the 1rst **Scientific and Pedagogic Server** in Strasbourg and in France: ***ChemPhys*** (n°53)
- **Scientific Organizer** of "*Three Days Dedicated to Space"* (n° 21)
- **Laboratory Direction** (n° 9)
- **Financial Support**:
  - from the Jean-Marie Lehn Foundation and the French Public Treasury which provide financial facilities since 2018 https://fondation-lehn.fr/projet/marie-paule-bassez/
  - from the French National Agency for Research and Pr. Kensei Kobayashi-Japan (n°79)

- from the French Embassy in Australia (n° 16)
- from the French Government for conducting Research in Australia (n°12)
- from the Food and Agriculture Organization, FAO, of the United Nations (n°9)

149 M.-P. BASSEZ (2026) *"A new hypothesis for the formation of anatase-hosting microbialites: Study of the stromatolites from Saint-Jean-de-la-Rivière, Cotentin, France.* **Poster** at the ORIGINS 2026 Conference of the International Society for the Study of the Origins of Life, ISSOL, and of the Astrobiology Commission of the International Astronomical Union, IAU. 06-10 July, Paris, France.

148* M.-P. BASSEZ (2026) **Cover Image** of the Journal of Raman Spectroscopy 57(8) p.1309-1524 ISSN 0377-0486 https://doi.org/10.1002/jrs.70137



147* M.-P. BASSEZ (2026) *" Raman Line Scan Analyses and a New Hypothesis for the Formation of Anatase-Hosting Microbialites: Study of the Stromatolites from Saint-Jean-de-la-Rivière, Cotentin, France"* **open Article*** and Supplementary Information, Journal of Raman Spectroscopy 57(8):1463-1480, on-line 27 April. https://doi.org/10.1002/jrs.70146

146 M.-P. BASSEZ (2025) *"The oxidation of ferrous iron in anoxic high-subcritical water. Experiments and Geobiotropy"*. **Seminar**. ICMCB, Institut de Chimie de la Matière Condensée de Bordeaux, 06 November.

145 M.-P. BASSEZ (2025) *"Raman spectroscopy of the lower Cambrian stromatolites from Cotentin, France"*, **Poster** at the M-FED25, Microbialites-Formation, Evolution and Diagenesis, 30 Sept-03 Oct, Hanover, Germany.

144 M.-P. BASSEZ (2025) *"For the Geobiotropy, Follow the High Subcritical Water"*, **Poster** at the Conference BEACON, Biennal Astrobiology Conference, EAI, 1-5 July, Reykjavik, Island.

143 M.-P. BASSEZ (2025) *"Geobiotropy"*, **Poster** at the School *Traces of Early Life*, of the European Astrobiology Institute, EAI, 2-6 June, Stirling University, Scotland.

142 M.-P. BASSEZ (2025) *"Thermodynamics, Heat and Organic Molecules on Enceladus"*, 45 min **Lecture** at the School *Traces of Early Life*, of the European Astrobiology Institute, EAI, 06 June, Stirling University, Scotland.

141 M.-P. BASSEZ (2025) *"Physical-Chemistry for the Search on Early Life"*, 45 min **Lecture** at the School *Traces of Early Life*, of the European Astrobiology Institute, EAI, 03 June, Stirling University, Scotland.

140 M.-P. BASSEZ (2024) *"La Géobiotropie"*, Seminar of the French Network of Organic Matter / Réseau Matière Organique, ResMO, 24-28 March, Semur-en-Auxois, France. **Poster** in the session: MO extraterrestres et précambriennes.
https://www.chemphys.fr/CV/ResMO2024_Geobiotropie.pdf

139* M.-P. BASSEZ (2023) *"The Possible Role of Anoxic Alkaline High Subcritical Water in the Formation of Ferric Minerals, Methane and Disordered Graphitic Carbon in a BARB3 Drilled Sample of the 3.4 Ga Buck Reef Chert"* **open Article*** Origins of Life and Evolution of Biospheres 53:1-41 and Supplementary Information, SI, *"The BARB3_23B disordered graphitic carbon"* 23 pp., on-line 16 August. https://doi.org/10.1007/s11084-023-09638-x

138 M.-P. BASSEZ (2023) "*The possible role of anoxic alkaline high subcritical water in the construction of the BIFs: the case of the 3.4 Ga Buck Reef Chert, South Africa"* Goldschmidt Conference, 7-14 July, Lyon, France. **Poster** in the workshop ExTerra 2023: understanding subduction. https://www.chemphys.fr/mpb/CV/Gold2023_Lyon.pdf

137 M.-P. BASSEZ (2022) Participation to the field trip "*the Western Dolomites, Italy"* 10-13 Sept. https://www.chemphys.fr/mpb/CV/Dolomites_20220913.jpg

136 M.-P. BASSEZ (2022) *"Ferric minerals at extremely low oxygen fugacity"* International school: f(O_2), Understanding oxygen fugacity, 5-9 September, Trieste, Italy. **Oral** 7 Sept.
https://fo2school.units.it/program.php
https://www.chemphys.fr/mpb/CV/fO2School_Abstract.pdf
https://www.chemphys.fr/mpb/CV/Bassez_Trieste_Talk.mp4

135* M.-P. BASSEZ (2022) " *Can the high subcritical water contribute to explain the Neoproterozoic BIFs?"* **Article*** published in the **Springer** ASTI series: Advances in Science, Technology & Innovation series, *Recent Research on Geomorphology, Sedimentology, Marine Geosciences and Geochemistry*, eds. Ciner, Grab, Jaillard, Doronzo et al. eBook ISBN 978-3-030-72547-1; hardcover ISBN 978-3-030-72546-4; 378pp
https://www.springer.com/fr/book/9783030725464# p. 289-291:
https://link.springer.com/chapter/10.1007/978-3-030-72547-1_62

134* M.-P. BASSEZ (2021) *"Symmetry in Prebiotic Chemistry"* **Editorial* open on-line** on 29 November, for the Journal Symmetry. The project was very pioneering. No article was published. Several research groups continue the project on a long-time scale.
how to cite: https://www.chemphys.fr/mpb/CV/Symmetry_BassezEditorial_2021Nov29.pdf
https://www.chemphys.fr/CV/Symmetry_Special_Issue_MPB_Information.png

133 M.-P. BASSEZ (2021) Participation to the field trips "Kaiserstuhlvulkanismus" on 17-18 Sept., and *"Geology of the Kraichgau"* on 24 Sept
https://www.chemphys.fr/mpb/CV/Kaiserstuhl.jpg

132* M.-P. BASSEZ (2021) *"Geobiotropy on Early Earth and in the Rocky Universe"* GeoKarlsruhe'2021, 19-24 Sept., Karlsruhe, Germany, Early Earth, geodynamics,

environments, & the emergence of life. **Poster**, session 19.2
https://doi.org/10.48380/dggv-f8d1-9j54
https://www.chemphys.fr/mpb/CV/GeoKarlsruhe.jpg

131 M.-P. BASSEZ (2021) *"The redox anoxic system, Fe-high subcritical water, for the production of ferric iron"* 3rd European Mineralogical Conference, **emc'2020**, **Cracow**, Poland, 29 August-2 Sept., remote **Oral** presentation on 31 August, T6 Experimental Mineralogy and Petrology, T6-S1 Spotlight on oxidation sate and other redox proxies from Earth surface to core
https://www.chemphys.fr/mpb/CV/emc2020_Oral.pdf

130 M.-P. BASSEZ (2020) "*La formation du fer ferrique dans une eau anoxique, proche de l'état supercritique et à pH très basique"* **Oral** presentation at the Institute of Earth Sciences, ISTerre, Université de Grenoble Alpes; 06 July, 11 am.
https://www.chemphys.fr/mpb/CV/Seminaire_ISTerre_Annonce.pdf

129 M.-P. BASSEZ (2020) *"Can high subcritical water induce Fe-Mn-Au redox relations?"* **e-Poster** 4278, 36th IGC, Inter. Geological Congress, **Dehli**, India, 2-8 March. cancelled

128 M.-P. BASSEZ (2019) *" Can the high subcritical water contribute to explain the Neoproterozoic BIFs (Arabian-Nubian Shield)?"* **CAJG**, 2nd Springer Conference of the Arabian Journal of Geosciences, **Sousse**, Tunisia, 25-28 November**. Oral**, ID-377, track 7: Geochemistry, Mineralogy, Petrology, Volcanology / session OS1, Tues. 26 Nov. 14h
https://www.chemphys.fr/mpb/CV/CAJG2019_Program_p91.pdf p.91
https://www.chemphys.fr/mpb/CV/CAJG2019.png

127 M.-P. BASSEZ (2019) Studies and observations of the geology and life fossils in **Tunisia**, *"Tectono-stratigraphic history of the Saharan domain of southern Tunisia"*, 21-24 November.
https://www.chemphys.fr/mpb/CV/TriassicSahara2019.jpg

126 M.-P. BASSEZ (2019) *"Ferric iron in anoxic conditions"***, short Oral communication,** Agricultural University of **Athens**, 4 Oct. 17h30

125 M.-P. BASSEZ (2019) Visit: *"Les volcans du Rossberg"*, Southern Vosges, 28 Sept Maison de la Terre, Sentheim Fr.
https://www.chemphys.fr/mpb/CV/OrguesAndesitiques_Rossberg2019Sept28.jpg

124 M.-P. BASSEZ (2019) *"Follow the High-Subcritical Water"* European Planetary Science Congress-Division for Planetary Sciences of the Astronomical American Society, AAS, **EPSC-DPS** joint Meeting, Centre International de Conférences de **Genève**, **CICG**, Swiss, 15-20 Sept. **Oral,** session: Outer Planet Systems / Ocean World and Icy Moons / Icy Satellites, Thursday 19 Sept. 14h45, EPSC Abstracts Vol 13, EPSC-DPS2019-542-1
https://meetingorganizer.copernicus.org/EPSC-DPS2019/EPSC-DPS2019-542-1.pdf
https://www.chemphys.fr/mpb/CV/EPSC-DPS_CICG_Geneve.jpg
https://www.chemphys.fr/mpb/CV/EPSC-DPS_CICG_Geneve2.jpg

123 M.-P. BASSEZ (2019) Participation to the geological field trip in **Milos**, Greece: *"Mineral deposits of Milos island"* 31 August-7 Sept.
https://www.chemphys.fr/mpb/CV/Milos1.jpg
https://www.chemphys.fr/mpb/CV/Milos_Roche1.png

122 M.-P. BASSEZ (2019) Participation to the geological field trip in **Swiss**: *"Science and Minerals of Switzerland"* 24-27 August.
https://www.chemphys.fr/mpb/CV/Swiss_MnMine4.jpg

121 M.-P. BASSEZ (2019) *"Formation of Ferric Minerals in an Anoxic World"* **Goldschmidt** Conference, **Barcelone**, Es, 17-23 August, Evolution and metabolism of microorganisms transforming Earth's early environments, **Oral**
https://goldschmidt.info/2019/program/programViewThemes session 7e / Abstract

120* M.-P. BASSEZ (2019) *"High Subcritical Water for the syn-Formation of Ferric Minerals and Molecules of Life"*, Astrobiology Scientific Conf., **AbSciCon, Bellevue**, WA, USA, 24-28 June **Poster # 127-061**, session: Enceladus, the potential for life; the prospects for discovering it, **published** online 27 June with Earth and Space Science **Open Archive**, ESSOAr
https://doi.org/10.1002/essoar.10500982.2

119* M.-P. BASSEZ (2019) *"High Subcritical Water-Rock Interaction for the Formation of Ferric Minerals, in the Absence of Oxygen, UV Light and Microorganism"*. **open Article***, E3S Web of Conferences 98:01002, WRI-16 https://doi.org/10.1051/e3sconf/20199801002

118* M.-P. BASSEZ (2019) *"Follow the High Subcritical Water"*. **open Article*,** Geosciences 9:249 25pp. https://doi.org/10.3390/geosciences9060249

117 M.-P. BASSEZ (2018) *"L'eau proche de l'état supercritique à l'origine de minéraux de fer ferrique et de molécules de la vie, dans le processus de Géobiotropie".* Rencontres de la Société Française d'Exobiologie, **SFE'2018,** Observatoire de Haute Provence, **Saint Michel l'Observatoire**, 15-18 Oct. **Oral** 16 Oct.
http://www.exobiologie.fr/index.php/actualites/evenements/rencontres-sfe-2018/

116 M.-P. BASSEZ (2018) *"Water in the High-Subcritical Domain as a Trigger for the Formation of Ferric Minerals and Geobiotropic Molecules of Life".*
EANA'2018, **Berlin**, De, 24-28 Sept., **Oral,** 24 Sept 18h45
http://www.eana-net.eu/index.php?page=Conferences/Docs_EANA18/schedule
http://www.eana-net.eu/Conferences/Docs_EANA18/EANA2018_AbstractBook.pdf
https://www.chemphys.fr/mpb/CV/EANA_mpbAbstract.pdf

115* M.-P. BASSEZ (2018) *"Water near its Supercritical Point and at Alkaline pH for the Production of Ferric Oxides and Silicates in Anoxic Conditions. A New Hypothesis for the Synthesis of Minerals Observed in Banded Iron Formations and for the Related Geobiotropic Chemistry inside Fluid Inclusions".* **open Article***
Origins of Life and Evolution of Biospheres 48(3):289-320 on-line 08 August
https://doi.org/10.1007/s11084-018-9560-y

114 M.-P. BASSEZ (2018) **Selected** to participate to the "*Grand Tour of the Pilbara Craton"*, **Western Australia**, 2-11 July.
https://www.chemphys.fr/mpb/CV/Pilbara2018_LeGrandTour_Poem.pdf
https://www.chemphys.fr/mpb/CV/Pilbara1.JPG
https://www.chemphys.fr/mpb/CV/Pilbara2.JPG

113 M.-P. BASSEZ (2018) Participation to the geological field trip: *"The geothermal systems in the **Taupo Volcanic Zone**"*, New Zeeland, 27-29 June.
https://www.chemphys.fr/mpb/CV/TVZ_NZ.JPG

112 M.-P. BASSEZ (2018) *"High-Subcritical Water for the Synthesis of the Minerals observed in Banded Iron Formations and for the Related Geobiotropic Chemistry inside Fluid Inclusions"* Australasian Astrobiology Meeting, **AAM**, **Rotorua,** N.Z., 25-26 June, **Poster**.

111 M.-P. BASSEZ (2018) **Author, Publisher** of the ***e-book*** *Chemphys.*
Preface by Jean-Pierre Sauvage, 2016 Nobel Laureate in Chemistry.
Two publishers required an epub format, which is not appropriate. I constructed the book with Acrobat Reader Pro. http://chemphys.u-strasbg.fr/mpb/index.html

110 M.-P. BASSEZ (2018) *"Anoxic Formation of Ferric Iron".* University of **Johannesburg**, South Africa, dept. Geology. **Oral**, 16 March.

109 M.-P. BASSEZ (2017) *"Rocks, Minerals, Prebiotic Chemistry and Geobiotropy".*
Goldschmidt'2017, **Paris**, Fr.
Convener of the session 14a: "*Exogenous Organic Compounds, Minerals, Prebiotic Molecules and Geobiotropy.*" and **Oral**: Tues.15 August 17h15
https://goldschmidt.info/2017/program/programViewThemes#period_269_2923_5173 Tue PM

108 M.-P. BASSEZ (2017) Participation to the workshop and field trip: "*Recognizing the criteria for ancient impact structures"*, **Santa Fe**, 26 July.

107 M.-P. BASSEZ (2017) *"A Hypothesis to Explain the Presence of Amino Acids in the Tagish Lake Meteorite".* 80th Annual meeting of the meteoritical society, **MetSoc'2017**, **Santa Fe**, NM, USA; **Oral**: 25 July, 3pm, Session: Volatiles, carbon and organics-the universal cycle; Abstract: LPI#1987, MetSoc#6035.
https://www.hou.usra.edu/meetings/metsoc2017/pdf/sess251.pdf

106 M.-P. BASSEZ (2017) *"Geobiotropy: the Evolution of Rocks in Symbiosis with Prebiotic Chemistry".* XVIIIth International Conference on the Origin of Life, **ISSOL'2017**, **San-Diego,** CA, 16-21 July. **Oral** on 18 July, and **Poster**
Abstract #4045 https://www.hou.usra.edu/meetings/issol2017/pdf/sess302.pdf
https://www.chemphys.fr/mpb/CV/ISSOL2017.MOV

105 M.-P. BASSEZ (2017) *"Fluid Inclusions in Radioactive Rocks and Geobiotropy".* European Current Research on Fluid Inclusions, **ECROFI**'2017, **Nancy**, Fr, 23-29 June.
Poster #S2.P02, Session : New Frontiers in inclusion research. Abstract p.175 in:
http://2017.ecrofi.univ-lorraine.fr/files/2016/03/catalogue-ecrofi-basseresolution2.pdf
https://www.chemphys.fr/mpb/CV/ECROFI2017_Inclusion_Geobiotropy.pdf

104* M.-P. BASSEZ (2017) *"Anoxic and Oxic Oxidation of Rocks Containing Fe(II)Mg-Silicates and Fe(II)-Monosulfides as Source of Fe(III) Minerals and Hydrogen. Geobiotropy".* **Article*** Origins of Life and Evolution of Biospheres, 47(4): 453-480, on-line March 2017.
https://doi.org/10.1007/s11084-017-9534-5
http://rdcu.be/qxSs/

103* M.-P. BASSEZ (2017) *"Ferromagnesian Silicate and Ferrosulfide Rocks as a Source of Magnetite and Hydrogen".* **open Article***: Procedia Earth and Planetary Science 17, 492-495.
https://doi.org/10.1016/j.proeps.2016.12.124

102 M.-P. BASSEZ (2016) # Participation to the field trip *"Cabeço de Vide hyperalkaline mineral waters"*, 19 Oct. https://www.chemphys.fr/mpb/CV/WRI2016_PhotoCabeo1.jpg
https://www.chemphys.fr/mpb/CV/WRI2016_PhotoCabeco2.jpg
Participation to the field trip *"Azores"*, 21-23 Oct.

101 M.-P. BASSEZ (2016) *"Ferromagnesian Silicate and Ferrosulfide Rocks as a Source of Magnetite and Hydrogen".* Water Rock Interaction, **WRI'2016, Evora**, Portugal, 16-21 Oct.
Oral presentation, 20 Oct. 16h
https://www.chemphys.fr/mpb/CV/WRI2016_Program.pdf

https://www.chemphys.fr/mpb/CV/WRI2016_Photos.png

100 M.-P. BASSEZ (2016) *"Geobiotropy: the evolution from the world of rocks to the world of life".* **EANA'2016**, **Athens**, Greece, 27-30 Sept., **Oral** presentation 27 Sept.16h20, http://chemphys.u-strasbg.fr/mpb/CV/EANA16_Scientific_Programme.pdf

099* M.-P. BASSEZ (2016) *"Geobiotropy"* Lunar and Planetary Science Conference, 47th **LPSC2016, The Woodlands**, Texas, 21-25 March 2016. Abstract #1853 https://www.hou.usra.edu/meetings/lpsc2016/pdf/sess804.pdf **open**

098* M.-P. BASSEZ (2015) *"Water, Air, Earth and Cosmic Radiation"* **Article*** Origins of Life and Evolution of Biospheres 45:5-13, 2015. https://doi.org/10.1007/s11084-015-9402-0

097 M.-P. BASSEZ (2014) *"Ferromagnesian Rocks in Association with Carbonates as a Signature for Life".* European Astrobiology Network Association, **EANA'2014**, **Edinburgh**, England, 13-16 Oct. **Oral** presentation on 13 Oct., session: Minerals and Signatures of Life http://chemphys.u-strasbg.fr/mpb/CV/EANA14_Programme.pdf

096 M.-P. BASSEZ (2014) *"Water, Air, Earth and Cosmic Radiation".* **Origins'2014**, ISSOL (Int. Society for the Study of the Origin of Life)-Int. Astrobiology Society and Bioastronomy, joint conference, **Nara**, Japan, 06-11 July. **Poster**, session Early Earth https://www.chemphys.fr/mpb/CV/Origins2014_PosterProgram.pdf https://www.chemphys.fr/mpb/CV/Origins2014_Photo.JPG

095 M.-P. BASSEZ (2013) *"Geochemical origin of biological molecules".* European Geosciences Union, **EGU'2013**, Vienna, Austria 06-12 April. **Oral** presentation, Tues. 9 April. 9h30, session Planetary Evolution and Life, PS8.1
Geophysical Research Abstracts Vol. 15, EGU2013-22, 2013
https://meetingorganizer.copernicus.org/EGU2013/orals/11892
http://adsabs.harvard.edu/abs/2013EGUGA..15...22B

094 M.-P. BASSEZ (2013) *" The Search for Life in the Universe,* La recherche de vie dans l'univers". **Oral** Presentation, Université de Strasbourg, 31 Janv.
https://podv2.unistra.fr/video/8916-la-recherche-de-vie-dans-lunivers/



093 M.-P. BASSEZ[#], Y. TAKANO, K. KOBAYASHI (2012) *"Prebiotic organic microstructures".* 12th European Workshop on Astrobiology, **EANA** (European Astrobiology Network Association**)**, AlbaNova University Centre, **Stockholm**, Sweden, 15-17 Oct., **Poster** P2-05
http://agenda.albanova.se/conferenceDisplay.py?confId=2996
https://indico.fysik.su.se/event/2996/

092* M.-P. BASSEZ, Y. TAKANO, K. KOBAYASHI (2012) *" Prebiotic organic microstructures"*, **open Article***, Origins of Life and Evolution of Biospheres 42 (4): 307-316 https://doi.org/10.1007/s11084-012-9290-5

The above list concerns achievements after my departure from teaching. No more teacher meetings, nor committees, councils, assemblies, lectures to prepare, reports and exams to correct, students and teachers application files to examine, student business internships to follow....

091 M.-P. BASSEZ[#], Y. TAKANO, K. KOBAYASHI (2012) *"Prebiotic organic microstructures",* **Gordon** Research Conf. on the Origin of Life, **Galveston**, TX, 08-13 January. **Poster** P4
https://www.grc.org/origin-of-life-conference/2012/

090* M.P. BASSEZ, Y. TAKANO, K. KOBAYASHI (2011) "*Prebiotic organic microstructures"* **Article**, Nature Precedings, posted 12 Nov. https://doi.org/10.1038/npre.2011.4694.2

089* M.-P. BASSEZ (2011) *"Emergence of Life"*
open Editorial* for the Journal Life, 1(1): 7-8 https://doi.org/10.3390/life1010007

088 M.-P. BASSEZ[#], Y. TAKANO (2011) *"Organic microstructures".*
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087 M.-P. BASSEZ[#], Y. TAKANO, N. OKHOUCHI (2011) *"Detection of molecular biosignatures inside rocks".*, **Origins** 2011, ISSOL and Bioastronomy joint Conference, **Montpellier-** France 04-08 July. **Poster** P2-17 https://www.chemphys.fr/mpb/CV/ISSOL2011_P2-17.pdf

086 M.-P. BASSEZ[#], Y. TAKANO, N. OHKOUCHI (2011) *"A search for molecular biosignatures*
085 *inside rocks".* Workshop **Geobiology in Space** Exploration, ESA_NASA_Morocco, **Marrakech,** 7-14 Feb. **Poster**
Field trip Geology and Geobiology **from PreCambrian to Quaternary**
https://www.chemphys.fr/mpb/CV/Geobiology2011_Workshop_FT_Morocco.pdf

084 M.-P. BASSEZ[#], Y. TAKANO, N. OHKOUCHI (2010) *"Organic analysis of peridotite rocks from the MAR".* Colloquium : First chemical steps towards the origin of life, **NIS**, **Torino**-It, 16-17 Sept. https://www.nis.unito.it/stuff/NIS_Colloquium_OOL_final.htm

083* M.-P. BASSEZ, Y. TAKANO (2010) *"Prebiotic organic globules*".
open Article, Nature Precedings, posted 21 July. https://doi.org/10.1038/npre.2010.4694.1

082 M.-P. BASSEZ[#], Y. TAKANO, N. OHKOUCHI (2009) *"Organic analysis of peridotite rocks from the MAR"*. **AGU** Fall Meeting, **San Francisco**, Ca, 14-18 Dec.
Poster session: Planetary Science/Potential Biomarkers on Mars/ P43C-1441
http://abstractsearch.agu.org/meetings/2009/FM/P43C-1441.html
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081* M.-P. BASSEZ, Y. TAKANO, N. OHKOUCHI (2009) *"Organic analysis of peridotite rocks from Ashadze and Logatchev hydrothermal sites".*
open Article*, International Journal of Molecular. Science 10 (7), 2986-2998.
https://doi.org/10.3390/ijms10072986

080 M.-P. BASSEZ (2008) "*Prebiotic Synthesis under Hydrothermal Conditions*",
Oral Seminar in Pr. Kensei Kobayashi Laboratory, dept of Chemistry and Biotechnology, **Yokohama** Univ., Japan, 29 Oct.

079 M.-P. BASSEZ (2008) With the help of André Brack, I became the **Recipient** of a grant from the French National Agency for Research, ANR, (2000 euros) managed by the National Center for Scientific Research, CNRS, Orléans, Fr., and from Pr. K. Kobayashi, Jp. (1000 euros) for a collaborative work.

078* M.-P. BASSEZ (Sept. 2008- Aug. 2009) **Guest Editor** of 23 articles for the special issue ***"Origin of Life"*** of the open access Journal, **IJMS**, Int. Journal of Molecular Sciences. https://www.mdpi.com/journal/ijms/special_issues/origin-of-life

077* M.-P. BASSEZ (2009) "*Prebiotic Synthesis under Hydrothermal Conditions*". **open Article***, Special issue "**abstracts** from the ISSOL'08 meeting" Origins of Life and Evolution of Biospheres, 39 (3-4) p. 223-225. https://doi.org/10.1007/s11084-009-9164-7 p. 223-225

076 M.-P. BASSEZ (2008) "*Prebiotic Synthesis under Hydrothermal Conditions*". 15th Int. Conf. on the Origin of Life, **ISSOL'08**, **Florence**-Italy, 24-29 August. **Poster** P-2-6

075* M.-P. BASSEZ (2009) "*Prebiotic Synthesis under Hydrothermal Conditions*". **Article***, Comptes Rendus Chimie, Paris-Fr, 12 (6-7): 801-807, on-line 05 Dec. 2008 https://doi.org/10.1016/j.crci.2008.10.013
Editor Erratum (2013): article qualified as article and not as review, Comptes Rendus Chimie 16(11): 1071. https://doi.org/10.1016/j.crci.2012.12.014

074* M.-P. BASSEZ (2008) *" Contribution à la rédaction d'un Code de Conduite pour le développement des nanotechnologies et autres technologies" Contribution to a code of Conduct for the Development of Nanotechnologies and other Technologies.* **CNRIUT**'08, Lyon-France, 29-30 May, **Oral** presentation. 29 May/période-1/salle A. https://www.chemphys.fr/mpb/CV/CNRIUT2008_Program.pdf
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073* M.-P. BASSEZ (2008) *"Synthèse prébiotique dans les conditions hydrothermales" Prebiotic Synthesis in Hydrothermal Conditions*. **CNRIUT**'08, Lyon-Fr, 29-30 May, **Oral** presentation. 29 May/période-1/salle C. https://www.chemphys.fr/mpb/CV/CNRIUT2008_Program.pdf
Article* : https://www.chemphys.fr/mpb/CV/CNRIUT2008_PrebioticSynthesis.pdf

072 M.-P. BASSEZ (2008-2019) **Director, Author**, **Publisher**, *"La Vie, ses Origines, sa Diversité. Life, Origins and Diversity"* ***cyber*Book**. http://chemphys.u-strasbg.fr/mpb/teach/originevie.html

071 M.-P. BASSEZ (2007) *"L'eau polaire et apolaire, un solvant pour la vie. Polar and apolar water, a solvent for life"*. **Oral** presentation, in place of Nathalie Cabrol, 26/06, 9th International Symposium on **Water**, **Cannes**-France, 26-28 June. http://chemphys.u-strasbg.fr/mpb/CV/Cannes-9th-Water-Conf.pdf

070 M.-P. BASSEZ (2006) *"L'eau, sa structure, sa polarité et la vie. The structure and polarity of water, and life"* short **Oral** presentation at the School: L'eau dans les milieux biologiques, **Roscoff**, Fr, 25-28 Oct. www-llb.cea.fr/eau-cellulaire/programme.html

069 M.-P. BASSEZ (2006) *"L'eau polaire et apolaire, un solvant pour la vie. Polar and apolar water, a solvent for life"*.
Poster P12, National Colloquium **Exobiology**, **Orléans**-Fr, 22-24 May.

068 M.-P. BASSEZ (2005-2011) **Editor, Publisher**, *"Le développement durable. A Sustainable Earth"* ***cyber*Book** composed of student contributions written from 2005 to 2011. http://chemphys.u-strasbg.fr/mpb/teach

067 M.-P. BASSEZ (2003) *"Réflexions sur un exemple de cyberenseignement en chimie. Return on an example of cyberLearning in Chemistry"*. **Oral** presentation at the workshop: **Apprendre autrement**, Other paths for Learning. ADIUT-Bruno Rossetto, **Montrouge**-France, 11 Dec.

066 M.-P. BASSEZ (2003) *"Is high pressure water the craddle of life?*".
Poster, **Exobio'03**, **Propriano**, France, 20-27 Sept.

065* M.-P. BASSEZ (2003) "*Is high pressure water the craddle of life?*"
Article* J. of Physics: Condensed Matter, 15, L353-L361.
http://doi.org/10.1088/0953-8984/15/24/101

064 M.-P. BASSEZ (2003) *"L'université en ligne. The University on-line "*.
Document with suggestions, given to the ambassador Michel Peissek, PrepCom2, World Summit on the Information Society, Geneva, Swiss, 27 Feb.

063 M.-P. BASSEZ (2003-2012) **Author**, **Publisher**, *"La Chimie-Physique en ligne. Physical Chemistry on-line "* ***cyber*Book**. http://chemphys.u-strasbg.fr/mpb/teach/coursenligne.html

062 M.-P. BASSEZ (2002-2005) **Editor, Publisher**, *"L'Atome, l'Energie, la Cinétique. Atoms, Energy and Kinetics"* ***cyber*Book** composed of student contributions, between 2002 and 2005.
http://chemphys.u-strasbg.fr/mpb/teach

061* M.-P. BASSEZ (2000) *" Un exemple de cyberEnseignement en chimie. An example of cyberLearning in chemistry "*.
open Article*, EPI, Enseignement Public et Informatique, Public Teaching and Computing, Paris, ISSN:1254-3985, n°99, p. 123-127. http://www.epi.asso.fr/revue/99/b99p123.htm

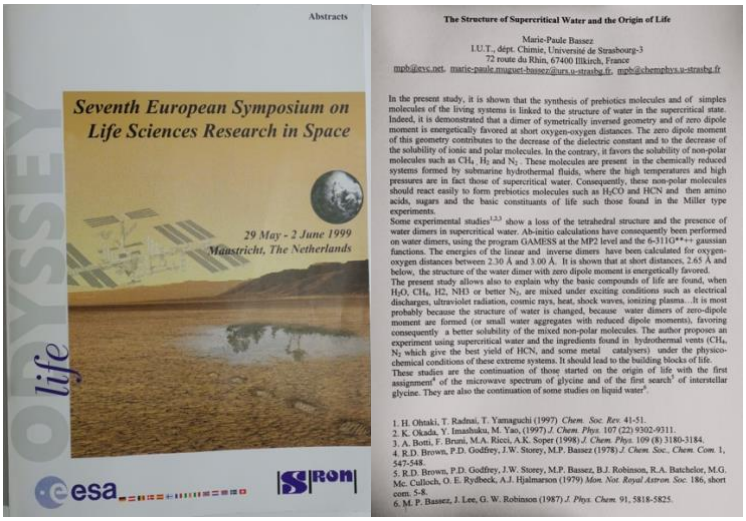
060 M.-P. BASSEZ (2000) *"L'eau, solvant polaire et non-polaire. Water as a polar and apolar solvent* ". **Oral** presentation at the Conference "L'eau, arme stratégique au XXI ème siècle?" **Strasbourg**-Fr, 25-26 May.

059 M.-P. BASSEZ (1999) *"La Science en Réseau. The Network of Science"*. Participation of the server *ChemPhys* to the **Week of Science**, la fête de la Science, **Strasbourg**-France, 18-24 Oct.
http://chemphys.u-strasbg.fr/mpb/CV/semaine_sciences/semaine_sciences/biblio/index.html

058* M.-P. BASSEZ (1999) *"La structure de l'eau supercritique et l'origine de la vie. The structure of water and the origin of life"*.
Article*, Science et Technologie, ed. l'Harmattan, Paris, ISBN 2-7384-7367-9, p. 583-591.

057 M.-P. BASSEZ (1999) "*The Structure of Supercritical Water and the Origin of Life*, La structure de l'eau supercritique et l'origine de la vie".
Oral presentation, CNRS workshop of the Group of Research, GDR, in Exobiology: Oceanic Hydrothermalism and Exobiology, **CNES-Paris**, France, 21-22 Sept.

056 M.-P. BASSEZ (1999) *"The structure of supercritical water and the origin of life"*.
Poster, **Life Odyssey Symposium**, 7th European Symposium on Life Sciences Research in Space, ESA, **Maastricht**-Netherlands, 29 May-02 June.
http://chemphys.u-strasbg.fr/mpb/CV/ESA1999/ESA-Maastricht-1999.jpg
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The Structure of Supercritical Water and the Origin of Life

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In the present study, it is shown that the synthesis of prebiotics molecules and of simples molecules of the living systems is linked to the structure of water in the supercritical state. Indeed, it is demonstrated that a dimer of symetrically inversed geometry and of zero dipole moment is energetically favored at short oxygen-oxygen distances. The zero dipole moment of this geometry contributes to the decrease of the dielectric constant and to the decrease of the solubility of ionic and polar molecules. In the contrary, it favors the solubility of non-polar molecules such as CH_4, H_2 and N_2. These molecules are present in the chemically reduced systems formed by submarine hydrothermal fluids, where the high temperatures and high pressures are in fact those of supercritical water. Consequently, these non-polar molecules should react easily to form prebiotics molecules such as H_2CO and HCN and then amino acids, sugars and the basic constituants of life such those found in the Miller type experiments.
Some experimental studies[1,2,3] show a loss of the tetrahedral structure and the presence of water dimers in supercritical water. Ab-initio calculations have consequently been performed on water dimers, using the program GAMESS at the MP2 level and the 6-311G**++ gaussian functions. The energies of the linear and inverse dimers have been calculated for oxygen-oxygen distances between 2.30 Å and 3.00 Å. It is shown that at short distances, 2.65 Å and below, the structure of the water dimer with zero dipole moment is energetically favored.
The present study allows also to explain why the basic compounds of life are found, when H_2O, CH_4, H_2, NH_3 or better N_2, are mixed under exciting conditions such as electrical discharges, ultraviolet radiation, cosmic rays, heat, shock waves, ionizing plasma...It is most probably because the structure of water is changed, because water dimers of zero-dipole moment are formed (or small water aggregates with reduced dipole moments), favoring consequently a better solubility of the mixed non-polar molecules. The author proposes an experiment using supercritical water and the ingredients found in hydrothermal vents (CH_4, N_2) which give the best yield of HCN, and some metal catalysers) under the physico-chemical conditions of these extreme systems. It should lead to the building blocks of life.
These studies are the continuation of those started on the origin of life with the first assignment[4] of the microwave spectrum of glycine and of the first search[5] of interstellar glycine. They are also the continuation of some studies on liquid water[6].

1. H. Ohtaki, T. Radnai, T. Yamaguchi (1997) *Chem. Soc. Rev.* 41-51.
2. K. Okada, Y. Imashuku, M. Yao, (1997) *J. Chem. Phys.* 107 (22) 9302-9311.
3. A. Botti, F. Bruni, M.A. Ricci, A.K. Soper (1998) *J. Chem. Phys.* 109 (8) 3180-3184.
4. R.D. Brown, P.D. Godfrey, J.W. Storey, M.P. Bassez (1978) *J. Chem. Soc., Chem. Com.* 1, 547-548.
5. R.D. Brown, P.D. Godfrey, J.W. Storey, M.P. Bassez, B.J. Robinson, R.A. Batchelor, M.G. Mc. Culloch, O. E. Rydbeck, A.J. Hjalmarson (1979) *Mon. Not. Royal Astron. Soc.* 186, short com. 5-8.
6. M. P. Bassez, J. Lee, G. W. Robinson (1987) *J. Phys. Chem.* 91, 5818-5825.

055 M.-P. BASSEZ (1999-2012) **Author, Publisher**, *"Les Techniques Instrumentales d'Analyse. Instrumental Analysis"* ***cyber*Book.**
http://chemphys.u-strasbg.fr/mpb/teach/coursenligne.html

054 M.-P. BASSEZ (1998-2002) **Editor**, **Publisher**, *"La Chimie Professionnelle. Professional Chemistry"* ***cyber*Book** composed of student contributions written from1998 to 2002.
http://chemphys.u-strasbg.fr/mpb/teach/index.html

053 M.-P. BASSEZ (1998) **Pioneer** in Strasbourg and in France, for the opening on the Web of the **open access *Server ChemPhys*** *for Science and Pedagogy,* Serveur scientifique et pédagogique ChemPhys. 5 Oct. Strasbourg-Fr., F.D.S.P. Fecit De Sua Pecunia (fait avec mon argent personnel). Since Sept 2007, the sites are hosted by other servers than mine.
http://chemphys.u-strasbg.fr https://www.chemphys.fr/mpb

052 M.-P. BASSEZ (1997-1998) **Director** of Thomas WITZEL report: "*Test of a molecular geometry software and study of supercritical water"*. IUT, Univ. Robert Schuman, Strasbourg.

051 M.-P. BASSEZ (1997) "*Energy and the Origin of Life*". **Oral** Propositions. Colloque de **prospective en exobiologie**, CNRS, **Roscoff**, Fr, 1-4 July. The Research Group in Exobiology, Groupe de Recherche, GDR, started on 01 Jan.1999. I am a member since 1997.

050 M.-P. BASSEZ (1996) "*The first study of the free rotating glycine molecule*".
Poster 163, 11th Int. Origin of Life Conference, **ISSOL'96**, **Orléans**, France, 7-12 July.

049 M.-P. BASSEZ (1995, 1996) "*Could Life on Earth have Originated in Space?*"
Oral presentations, International Space University, ISU, **Strasbourg-**Illkirch, Fr, Nov.

The above list concerns:
1. achievements in the international open access communication of my lectures and of student reports with the server and site *ChemPhys* that I opened on the web in 1998.
2. the continuation of my research on the *Origin of Life* that I started with the spectroscopy of diatomic molecules (1969-1973), the spectroscopy and radioastronomy of interstellar molecules (1976-1985) and the structure of liquid water (1986-1990). Since1995, I consider life near hydrothermal vents, studying the structure of supercritical and high-pressure water, and the interaction of high subcritical water with the minerals hosted by rocks. I propose that organic molecules of biological interest can

form inside pores, cavities and inclusions inside the rocks considering the rock as reactant and not only catalyst, and I call *Geobiotropy* the processes of transformation of the rock towards molecules of life.

048 M.-P. BASSEZ (1997) "*Several propositions for the organization in semesters of the studies in University Institutes of Technology, and for multidisciplinary diplomata, and for a library in the University of Strasbourg"*. **Document** written for the Management Assembly of the Robert Schuman Institute, 7 mai.
http://chemphys.u-strasbg.fr/mpb/CV/Bassez/Bassez1997Plurid.pdf

047 M.-P. BASSEZ (1996) *"Quelques suggestions pour une réforme du 1er cycle universitaire. Several suggestions for a reform of the university 1rst cycle: Semesters, Semester of orientation, Student Choice, Various Modules, Multidisciplinary Diplomata"*. **Propositions** with a note concerning Research, written for Les Etats généraux de l'Université, the National Education Forum, organized by François Bayrou, ONISEP-Paris, Oct. 1995 - April 1996,

046 M.P. BASSEZ (1995) *" Quelques suggestions pour une réforme du 1er cycle universitaire. Several suggestions for a reform of the university 1rst cycle", "*. **Poster**, 12th **JIREC**, Journées de l'Innovation et de la Recherche dans l'Enseignement de la Chimie, Days on Innovation and Research in Chemistry Teaching". Chemical Society of France and University Louis Pasteur, Strasbourg, 31 May-2 June. Proceedings of the conference on a paper booklet, p.77-78:
http://chemphys.u-strasbg.fr/mpb/CV/Bassez/Bassez1995JIREC.pdf

045 F.F. MUGUET, M.-P. BASSEZ (1998) "*Vibrations and VRT Dynamics of the Ammonia Dimer*" online Conference, **ECCC5**, 5th electronic computational chemical conference,
http://chemphys.u-strasbg.fr/mpb/papers/eccc5A/abstract.html November

044* F.F. MUGUET, M.-P. BASSEZ, G.W. ROBINSON (1998) "*An ab-initio UHF Study of the Equilibrium and Dissociation Saddle Point Geometries of the Hydronium Radical*".
Article*, Internet Journal of Chemistry www.ijc.com/articles/1998vl/24 08 May

043 F.F. MUGUET, M.-P. BASSEZ, G.W. ROBINSON (1996) "*Ab-initio Study of the Hydronium Radical. Investigation of the UHF Potential Energy Surface"*.
online Conference, **ECCC3**, 3rd electronic computational chemistry conference, November.
http://chemphys.u-strasbg.fr/mpb/papers/eccc3A/abstract.html

042* F.F. MUGUET, G.W. ROBINSON, M.-P. BASSEZ (1995) *"Evaluation of the vibration-rotation tunneling dynamics at the basis set superposition error, BSSE, corrected global minimum. Geometry of the ammonia dimer"*.
Article*, J. Chemical Physics, 102(9) p. 3655-3661. https://doi.org/10.1063/1.468594

041* F.F. MUGUET, G.W. ROBINSON, M.-P. BASSEZ (1991) *"The intermolecular vibrations of the bifurcated water dimer: an Ab-initio study*". **Article***, International Journal of Quantum Chemistry, 39, p.449-454. https://doi.org/10.1002/qua.560390320

040 M.-P. BASSEZ, F.F. MUGUET, G.W. ROBINSON (1990) "*The Hydrated Electron*".
Poster, Symposium on the **solvated electron**, **Argonne** National Lab., Illinois, 16-17 July.

039 M.-P. BASSEZ, F.F. MUGUET, G.W. ROBINSON (1990) "*The Hydrated Electron"*,
Poster, **Gordon** Research Conf. on Radiation Chemistry, **Newport,** Rhodes-Island, 8-13 July.

038* F.F. MUGUET, M.-P. BASSEZ (1990) *"Ab-Initio Computations of one and two Hydrogen or Deuterium Atoms in the Palladium Tetrahedral Site"*.
Article*, Journal of Fusion Energy 9, p. 383-389. https://doi.org/10.1007/BF01588267
Poster at the Workshop *"cold fusion phenomena*", **Santa Fe**, New Mexico 23-25 May 1989.

037 M.-P. BASSEZ (1988) *"L'électron hydraté. The Hydrated Electron"*.
Poster, Congress of the Chemical Society of France, **SCF**, **Nice**, France, 5-8 September.

036 M.-P. BASSEZ, F.F. MUGUET, G.W. ROBINSON (1988) "*The Hydrated Electron as a Rydberg Electron. Ab-initio Calculation*". **Poster**, **Gordon** Research Conference on Radiation Chemistry, **Newport**, Rhodes Island, USA, 11-15 July.

035* F.F. MUGUET, M.-P. BASSEZ, G.W. ROBINSON (1988) "*Aquated electrons, H_2O^- anions and OH^-/H_3O units"*. open **Article***, J. Physical Chemistry 92, p. 7262-7263.
https://doi.org/10.1021/j100337a023
https://pubs.acs.org/doi/epdf/10.1021/j100337a023

034 M.-P. BASSEZ (1987) "*The so-called anomalous properties of water. A molecular explanation*". **Poster**, Forum on Physical Chemistry, university of **Texas,** Austin, USA.

033* M.-P. BASSEZ, J. LEE, G.W. ROBINSON (1987) "*Is liquid water really anomalous?*".
Article*, J. Physical Chemistry 91, p. 5818-5825. https://doi.org/10.1021/j100306a060

032* G.W. ROBINSON, J. LEE, M.-P. BASSEZ (1987) "*Cooperativity in liquid water*".
Article* Chemical Physics Letters 137(4), p. 376-380.
https://doi.org/10.1016/0009-2614(87)80903-X

031* G.W. ROBINSON, J. LEE, M.-P. BASSEZ (1986) "*What is liquid water?*"
Article* J. Chemical Soc., Faraday Trans. 2: Molecular & Chemical Physics 82, p. 2351-2359
https://doi.org/10.1039/F29868202351

030* J. LEE, G.W. ROBINSON, M.-P. BASSEZ (1986) "*Temperature dependence of proton recombination and proton induced quenching for 2-naphtolate*".
Article* J. American Chemical Society 108, p. 7477-7480
https://pubs.acs.org/doi/pdf/10.1021/ja00284a005

029 M.-P. BASSEZ (1985) "*Journées de l'espace*, *Days for Space* ". **Booklet** with compiled references, deposited in the base of documents dedicated to Space, at the French National Center for Space Studies, Centre National d'Etudes Spatiales, **CNES**, Paris-Fr 40 pp., 4 Nov.

028 M.-P. BASSEZ (1985) *"Structure: analyse spectroscopique combinée des composés organiques*. *Structure: combined spectroscopic analysis of organic compounds"*. Enseignement assisté par multimedias **EAM-1ercycle, Multimedias-Based Training** for the 1^{rst} univ. cycle, deposited in the database ReCoDic Inventory of Didactic research (Recherches Coopératives en Didactique de la Chimie pour la circulation de l'information).

027 M.-P. BASSEZ (1985) *"Le moment dipolaire. The dipole moment"*. Enseignement Assisté par Ordinateur, **EAO-3ème cycle**, **Computer-Based Training** for the 3rd university cycle, deposited in the database ReCoDic Inventory of softwares.

026 M.-P. BASSEZ (1985) *"Analyse physico-chimique instrumentale*. *Instrumental analysis in physical chemistry"*. **Didactic Publication** deposited in the database: Publications et Documents en Didactique de la Chimie, 116 pp.

025 F.F. MUGUET, M.-P. BASSEZ (1985) **Inventors**, F.F. MUGUET, Patent Registrant.
"Dispositif et procédé d'absorption des ondes sonores. Device and process for the absorption of acoustic waves". Data base of the Center of Documentation of the Army, **CEDOCAR**.
Patent Application n°85 06943.

024* M.-P. BASSEZ (1985) *"Logiciel Wangscan. Wangscan software"* based on the computer software written for the 1981 thesis.
Software Registration LOG 27, at the Civil Society for Multimedia Authors, **SCAM**.

023* M.-P. BASSEZ (1985) *"Logiciel Starfit. Starfit software"* based on the computer software written for the 1981 thesis.
Software Registration LOG 26, at the Civil Society for Multimedia Authors, **SCAM**.

022 M.-P. BASSEZ (1985) Nationally and locally elected as **"Professeur des Universités**, **Full University Professor"**, to practice at the University Institute of Technology, IUT, of the Robert Schuman University (today University of Strasbourg).

The above list concerns some achievements since my appointment as a Full Professor

021 M.-P. BASSEZ (1983) **Scientific Organizer** of ***"Journées de l'Espace.*** *Three Days Dedicated to Extraterrestrial Space"*. IUT, University of **Angers**-France, 9-11 May.

020* M.-P. BASSEZ (1981) *" Etude spectrochimique de la glycine et de quelques molécules connexes. Analyse rotationnelle et observations du milieu interstellaire. Spectroscopic study of glycine and some related molecules. Rotational analysis and observations of the interstellar medium*.
Thesis n° 2498 "Doctorat d'Etat, Habilitation à Diriger les Recherches", Université de **Paris-Sud**, centre d'Orsay, (1981, etg0, 313) for the title : **Docteur ès Sciences**, Sciences Physiques (Chimie), Physical Sciences (Chemistry), 12 October.
http://chemphys.u-strasbg.fr/mpb/CV/Bassez/Bassez1981_Thesis.pdf

019 M.-P. BASSEZ (1979) "*Experimental microwaves: techniques in microwave spectroscopy*" Australian Universities **Internal Document, Monash** Univ. Clayton, Melbourne, Austr. 67 p.

018 M.-P. BASSEZ (1979) "*Radioastronomical observation of prebiotic molecules*"
Oral presentation, International conference, **Brisbane**, Australia.

017* R.D. BROWN, P.D. GODFREY, J.W. STOREY, M.-P. BASSEZ, B.J. ROBINSON, R.A. BATCHELOR, M.G. Mc. CULLOCH, O.E. RYDBECK, A.J. HJALMARSON (1979) *"A search for interstellar glycine*",
open Article*, Monthly Notices of the Royal Astronomical Society 186, p.5-8, 01 January.
https://academic.oup.com/mnras/article/186/1/5P/1041300

016 M.-P. BASSEZ (1978) **Initiator of a gift** to the **Monash Library**, Clayton, Australia. from the French Embassy in Australia, of ~40 books written by French authors.

015 M.-P. BASSEZ (1978) *"Rotational analysis of glycine"*,
Oral Presentation, International Conference, **Perth**, Australia.

014* R.D. BROWN, P.D. GODFREY, J.W. STOREY, M.-P. BASSEZ (1978) "*Microwave spectrum and conformation of glycine"*,
Article*, J. of the Chemical Society, Chemical Communications, p.547-548, 05 July.
https://pubs.rsc.org/en/content/articlelanding/1978/c3/c39780000547#!divAbstract

013* G.L. BLACKMAN, R.D. BROWN, P.D. GODFREY, M.-P. BASSEZ, A.L. OTTREY, D. WINKLER, B.J. ROBINSON (1977) *"Detection of J = 2→ 1 emission of acetonitrile, (CH_3CN) in Sgr.B2".*
open Article*, Monthly Notices of the Royal Astronomical Society 180, short comm. p.1-3.

https://academic.oup.com/mnras/article/180/1/1P/961067

012 M.-P. BASSEZ (1975) **Recipient** of one-year **financial** support from the French Government to conduct Research in Australia, on Interstellar Molecules and Origin of Life.



photo M.P. Bassez 1978

011 M.-P. BASSEZ (1975) *"Crystallography"*
Text Book with my lectures, Faculté des Sciences, **Alger**, Algérie.

010 M.-P. BASSEZ (1972-1975) *"Analyses physico-chimiques de composés alimentaires. Physico-chemical analyses of food compounds."*
Director of ~20 **Engineer Reports**, Institut National Agronomique, **INA**, **Alger**, Algérie

009 M.-P. BASSEZ (1971) **Director** of *"the Instrumental Analysis Laboratory"*, National Agricultural Institute, **INA**, **Alger**, Algérie. **Recipient** of an important **financial** support for the INA, from the Food and Agriculture Organization of the United Nations, **FAO**, to purchase, three Perkin Elmer instruments: Gaz Phase Chromatograph, Infra-Red Spectrometer, Ultra-Violet/Visible Spectrometer and one Varian Instrument for Electronic Spectroscopy,

008* B. VIDAL, M.-P. BASSEZ, P. GOUDMAND (1973) "Réactions de l'azote activé avec le tétrachlorure de tellure. *Reactions of active nitrogen tellurium tetrachloride*
Article*, Journal de Chimie-Physique 9, 1278-1284.

007* M.-P. BASSEZ (1971) " Contribution à l'étude par spectroscopie électronique et résonance paramagnétique électronique des réactions de l'azote activé sur des éléments du groupe VI B. *Contribution to the study of active nitrogen reactions on elements of the group VI B, by electronic transitions spectroscopy and electron paramagnetic resonance."*
Thesis, Université des Sciences et Techniques de **Lille**, for the title of **Doctor** specialty Physical-Chemistry**,** 30 June.
http://chemphys.u-strasbg.fr/mpb/CV/Bassez/Bassez1971_Thesis.pdf

006* B. VIDAL, M.-P. BASSEZ, P. GOUDMAND (1970) "*Reactions of active nitrogen with tellurium atoms*" **Article***, Chemical Physics Letters, 5 (7), 398-400.

005* P. DEVOLDER, M.-P. BASSEZ, P. GOUDMAND (1970) *"Etude par résonance paramagnétique électronique des polymères formés dans la réaction de l'azote activé sur les dérivés du soufre. Study by Electron Paramagnetic Resonance, EPR, of the polymers formed during the reaction of active nitrogen with sulfur compounds* ".
Article*, Comptes Rendus de l'Académie des Sciences, Paris, série C, 270, 1344-1347.

004 M.-P. BASSEZ (July 1970) *"Rotational Analysis of NS "* **Oral** Presentation, National Research Council of **Ottawa** (**Herzbzerg Institute** of Astrophysics since 1975), **Ontario**, Canada.

003* M.-P. BASSEZ, B. VIDAL, O. DESSAUX, P. GOUDMAND (1970) *"Analyse rotationnelle des bandes 0,5 et 0,6 du système 5/2 - $X\,^2\Pi_{3/2}$ de NSe. Rotational Analysis of the Bands 0.5 and 0.6 in the 5/2 - $X\,^2\Pi_{3/2}$ NSe system*."
Article*, Comptes Rendus de l'Académie des Sciences, Paris, série C, 270, 377-380.

002 M.-P. BASSEZ (1969) *" Etude par Résonance paramagnétique électronique du radical libre NS. Study of the free radical NS by Electron Paramagnetic Resonance, EPR ".*
Oral Presentation, Congress of the Chemical Society of France, **SFC**, **Lille.**

001* M.-P. BASSEZ (June 1969) *"Etude des radicaux libres par spectroscopie optique et spectroscopie des radiofréquences. Study of free radicals by optical and radiowave spectroscopy".* **Dissertation**, Univ. of Sciences and Techniques, **Lille**, Fr, for the obtention of the Diplôme d'Etudes Approfondies, D.E.A., specialty Physical-Chemistry.

INTERNATIONAL MOBILITY

Between 1968 and 1985, international mobility was undertaken and organized upon my personal initiative, since the international services inside French universities were not yet open.

LILLE-FRANCE (Oct. 1968 –Sept. 1971)

My teaching load concerned practical classes in general chemistry and tutorials in spectroscopy, at the "**Université des Sciences et Techniques**" while my research work was accomplished in Dr. Pierre Goudmand's Spectroscopy laboratory, on the thema of chemiluminescence of diatomic free radicals with the goal to study the reaction of active nitrogen on sulfur, selenium and tellurium atoms. The study by electron paramagnetic resonance, EPR, of the association in the solid phase of the free radicals NS, led to a novel macromolecular structure with branched side chains on the N-N bonds, and paramagnetic properties. During the month of **July 1970**, **Prof. Dr. Gerhard Herzberg (1971 Nobel Laureate in Chemistry)** permitted that I use his equipment at the **National Research Council of Ottawa**, in order to improve the results that I obtained in Lille. This work was reported in 4 original and independent articles published in international journals with reviewers and in a Doctor thesis, specialty physical chemistry.

"Contribution à l'étude par spectroscopie électronique et résonance paramagnétique électronique, des réactions de l'azote activé sur des éléments du groupe VI B".

ALGER-ALGERIA (Oct. 1971-Feb. 1976)

Attracted by higher grade and salary, and also by the sun, the beauty of the desert and the Mediterranean plants and flowers, I went to the "**Institut National Agronomique**" of Alger, to accomplish at the age of 24, some important teaching load and responsability functions. I was in charge (we would nowadays say: director) of the engineer instrumental physical-chemistry laboratory and of the 4th and last student year of this institute. I had to direct, as far as science and teaching were concerned, a small team of technical cooperants and about twenty engineer students per year. Financial support from international organisms such as F.A.O. was quite consequent and it was necessary to write proposals and develop the laboratory with a great number of analytical instruments.

My lectures in this "INA", were related to thermochemistry, instrumental analysis, electrochemistry, oenology, food physical-chemistry and I was also in charge of practical classes in instrumental analysis. Between October 1974 and February 1976, I gave lectures and tutorials on the properties of matter and cristallography, at the "**Ecole Polytechnique"** of Alger and I gave also tutorials and practical classes on physics of the solid state at the "**Faculté des Sciences**".

My research work was in direct connection with wine, cereal and oil companies and consisted in thermal, spectroscopic and chromatographic analyses with the modern equipment that I acquired for the laboratory. Results were published in about twenty engineer student reports. I could also initiate myself to fundamental research in astronomy, with Professor Svetchnikov, at the **observatory of Bouzareah**, Alger.

A detailed description of the accomplished work can be found in the letters of recommendation written by Professor Arbib, director of the department.

MELBOURNE-AUSTRALIA (March 1976-June 1980)

In the continuation of the spectroscopic work on diatomic molecules that I started in Lille, I was interested in the interstellar medium study of our galaxy, and thanks to Dr. James Lequeux, Astronom, Observatoire de Paris-Meudon, FR, who was aware of the unique laboratory in the world working both in spectroscopy and radioastronomy, I went to Australia, in the university Monash, at Clayton, **Melbourne**, in the laboratory of Professor Ron D. Brown. There, fundamental research fullfilled my time. Without husband neither children, at a rate of at least 12 h per day, without rest neither on Saturday nor on Sunday and almost without holidays besides around conferences, I spent four and a half years of my life studying **interstellar molecules**.

The main goal was to study the **rotational structure** of a molecule essential for living organisms to exist: **glycine**, the simplest amino-acid. The first results of my experimental work were obtained with a cell conceived by John Storey and were introduced in his Ph.D. thesis. Then, John Storey "kindly provided the portion of his Ph.D. thesis relating to the study of glycine" to American scientists of the N.B.S., National Bureau of Standards: R.D. Suenram and F.J. Lovas (J. Mol. Spectroscopy, Sept.1978, 72 :372) who could consequently build a cell in the required frequency domain for the analysis. I continued in Monash with the non-appropriate cell, working on some experimental improvements. Athough very complicated studies, my results were published before those of Suenram and Lovas. This research was accomplished with micro-wave spectroscopy equipment, and also mass and infra-red spectroscopy. Data were exploited through computing theoretical analysis.

With other scientists, I personally **searched** for this amino-acid in the molecular **interstellar clouds** of our galaxy during ~one month at the radiotelescope of Parkes, Australia, and ~one week at Kitt-Peak, Arizona, USA. This molecule has been searched also in Onsala, Sweden. But we did not report any positive detection. An American team: Snyder and Buhl obtained some observation time just before us in Kitt-Peak. Their report was also negative.

The second part of the project concerned studies in spectroscopy and radioastronomy of molecules connected to glycine, such as CH_3CN et CH_3OH and their search in the interstellar medium. Some results are published in articles and some others are reported in my "Docteur es Sciences thesis".

I also taught some practical classes for students in medical and engineering sciences and I was a tutor in French, physics and chemistry in the halls of residence: during two hours per week, I was available for students for answering their questions.

ANGERS-FRANCE (July 1980-December 1985)

At the end of my stay in Melbourne, although P. Thaddeus and C.A. Gottlieb invited me twice (April and July 1980) to work in their laboratory at NASA, Goddard Institute for Space Studies, with the goal to study the spectroscopy of ions, I preferred to return in France and make my country profit of the experience I acquired overseas.

As soon as I arrived at the **Institut Universitaire de Technologie,** Angers, in the applied biology department, I created four new experiments for practical classes: spectroscopic analysis of organic compounds with UltraViolet-Visible, Infra-Red and Nuclear Magnetic Resonance techniques and combined analysis of the spectra including mass spectra. My teaching load concerned tutorials in chemistry-biochemistry molecular structures and also lectures and tutorials in physics considering the instrumentation used in biology, medecine and agriculture. In 1982, my teaching concerned also tutorials and practical classes in computing. I was in charge of the practical classes equipments in chemistry and physics. I was also involved in the organization of some conferences for students given by external speakers, in some student study trips and in communication between the department and some industrial laboratories. I was also member of several committees.

In 1985 and 1986, as a scientific expert, I contributed to the construction of the physico-chemical data base GAPHYOR, on the Orsay-France campus. The director was J.C. Delcroix also director of the Supelec engineering school. I also wrote a software program for the determination of molecular structures through combined analyses of the UV-Vis, IR, RMN and mass spectra: STRUCTURE and another one for the determination of dipole moments: DIPOLE. I contributed to the study of an absorption process of acoustic waves with ferrofluids. With two other colleagues, I organized a three-days meeting on the thema: SPACE. I was the scientific organizer. One colleague organized a connection between art and science and the third one was the administrative coordinator.
Many other projects could not be achieved. For instance, the construction of a radiometric hygrometer in the range of 22,2 GHz, for which I had planned an international collaboration with the Jet Propulsion Laboratory, the Georgia Institute of Technology, and a French laboratory in electronics which abandoned the project because financial support was missing in France, or a collaboration with B.E. Turner of the National Radioastronomy Observatory in Charlottesville-USA, for radioastronomical search with American and French telescopes, project which also has not been financed.

LUBBOCK-TEXAS-U.S.A. (Jan. 1986-Dec. 1989)

In the **SPQR**, SubPicosecond and Quantum Radiation laboratory, in Texas Tech University, Lubbock, directed by G. Wilse Robinson, Robert A. Welch Professor, I worked only in research: on the **structure of liquid water**, of **hydrated ions and electrons**, using subpicosecond laser spectrocopy for a very short period of time, and various computers including the Cray in Pittsburgh for computational chemistry.

STRASBOURG - FRANCE (Jan. 1990-)

Research Activities

Initially, my research continued in collaboration with the SPQR laboratory.

Then, in 1995, following a lecture on the origins of life that I delivered as a guest lecturer at the **International Space University** (ISU) in Strasbourg, my research interests shifted towards a possible **hydrothermal origin of life**. In 1997, I began exploring the connections between two traditionally separate worlds: the mineral world and the living world. My investigations focused on the structure of water under high pressure and its interactions with rocks containing ferrous minerals, particularly electron-transfer processes potentially leading to prebiotic chemistry. I am grateful to the CNRS in Orléans and the French Exobiology Research Group for their financial support, modest in amount but sincerely appreciated.

During the year 2008-2009, I served as a guest Editor of 23 articles for the special volume "Origin of Life" of the open-access International Journal of Molecular Sciences, IJMS.

Teaching Activities

My teaching activities at the **IUT** Robert Schuman**,** Institut Universitaire de Technologie, focused on physical chemistry (thermodynamics, chemical kinetics, atomic and molecular structure), instrumental analysis (spectroscopy and chromatography), and students reports.

In 1998, at my own expense (*Fecit De Sua Pecunia*, FDSP), I opened on the web a Linux server, **ChemPhys**, providing worldwide open access to my lecture materials and student reports. This initiative was for Strasbourg and France a real innovation.

Beyond teaching and research, I participated in a wide range of university activities: International Exchange agreement between universities, Contribution to the elaboration of new teaching national programs, Communication with industrial laboratories, Scientific and academic boards of directors, Teaching boards of examiners, Professor and lecturer appointment committees. In addition, I contributed to the annual *Fête de la Science* and participated in diverse meetings, assemblies, forums, workshops...

Research as Honorary Professor

In July 2012, I was awarded the title of: **Professeur honoraire de l'Université de Strasbourg** (usually translated by Emeritus Professor) and became more available for research, writing of articles and participation to scientific conferences.

I developped the subject of interaction between minerals that are included inside rocks and water in the high subcritical and supercritical domains of temperature and pressure (results presented at the EGU 2013 in Vienna). In 2016, I introduced the concept of **geobiotropy** to describe the steps of chemical transformations from ferrous silicate rocks to molecules of life. In this framework, ferrous minerals are considered **reactants rather than catalysts**, emphasizing **electron transfer processes**.

I also proposed a new hypothesis to explain the formation of ferric compounds under anoxic conditions, at strongly alkaline pH and in the absence of microorganisms. This oxidation pathway may contribute to explain the formation of Archean and early Paleoproterozoic Banded Iron Formations (BIFs) as well as Neoproterozoic BIFs (Bassez, *Origins of Life and Evolution of Biospheres,* 2018 and 2023; Springer ASTI, 2022(2019)). The same mechanism may also be relevant to extraterrestrial objects, particularly Enceladus (Bassez, *Geosciences*, 2019).

In 2026, I introduced the complementary concept of **biogeotropy** to describe the limits of life through the oxidative decomposition of living cells and their transformation into carbonated rocks, involving electron transfer mediated by the semi-conductor anatase, TiO_2 (Bassez, *Journal of Raman Spectroscopy*, 2026)

Together, **geobiotropy** and **biogeotropy** describe two complementary directions of transformation between the mineral and living worlds: from mineral matter towards prebiotic chemistry and the potential emergence of life, and from living matter towards its decomposition and return to the mineral world.