

David GROSSIN

Materials Scientist



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Date of Birth: 10 December 1979
Citizenship: French

Research Expertise

“Characterization, synthesis, sintering and shaping (Coating, Additive Manufacturing) of calcium phosphate for medical applications” in CIRIMAT Lab (www.cirimat.fr), PPB Team (Phosphates, Pharmacotechnics, Biomaterials)

Curriculum - Appointments

Senior Associate Prof. (tenure)	Univ. of Toulouse (FR)	Materials Engineering	since 2018
Team leader of Phosphates, Pharmacotechnics, Biomaterials PPB (40 peoples)			since 2021
Member of executive board of the Engineering School INP-ENSIACET (FR)			2016-2020
Associate Member	Univ. of Birmingham (UK)	Sabbatical Research	2014-2015
Associate Prof. (tenure)	Univ. of Toulouse (FR)	Materials Engineering	2008-2018
Researcher (Post-doc)	CNRS (FR)	Materials Science	2007-2008
Assistant Prof.	Univ. of Caen (FR)	Materials Chemistry	2005-2007

Professional Preparation

D.U.	Univ. Paul Sabatier, Toulouse	Medical devices regulation diploma	2017
Habilitation	INPT, France	(HDR) Research Management	2016
Ph.D.	Univ. of Caen, France	Materials Chemistry	2006
Master II	Univ. of Caen, France	Materials Science	2002

Research Activities

Leader of (Amount of grants acquired for all partners: 4880 k€):

- 1 European project (H2020) www.doc-3d-printing.eu
- 5 international projects (Campus-France, Era-net, etc.)
- 1 national project (ANR)
- 3 regional projects (MP region, etc.)

Supervisor or co-supervisor of

- 5 Undergraduate students (Master 2 Research)
- 10 PhD students (co-supervision) (5 PhD currently)
- 4 Post doctorals & Young researchers

Member & Expertise

Chairman of the AFNOR S93P “Implants orthopedic” committee (French organization for standardization)

International expert of the ISO committee TC150 “Implants for surgery”

Member of the UNM 920 “additive Manufacturing” committee (French organization for standardization)

International expert of the ISO committee TC261 “Additive Manufacturing”

Member of the Editorial Board of Journal of the Australian Ceramics Society

Scientific expert for the French "National Research Agency (ANR)"

Awards

2019- "Prix international INP INNOV'2019" awarded by Toulouse INP

2016 - "Prix Léopold Escande" award to Emmanuelle KERGURLAY (Co-supervised by D. Grossin)

2014 - "Novelisées – 2014" awarded by Toulouse Métropole (NOVELA event)

2013 - 1st prize, 9th International Outsourcing & solutions for orthopedic implants and biomaterials (IMPLANT-2013)

Publications (full listing at the end of the CV)

Author of more 40 articles in refereed journals, and 3 chapters (book)

Most significant publications :

5. A Review of the Additive Manufacturing (3DP) of Bioceramics: Alumina, Zirconia (PSZ) and Hydroxyapatite Ferrage, L., G. Bertrand, P. Lenormand, D. Grossin, and B. Ben-Nissan. JOURNAL OF THE AUSTRALIAN CERAMIC SOCIETY, volume 53, Pages 11-20 (2017)
4. Hydroxyapatite coating on titanium by a low energy plasma spraying mini-gun, Demnati I, Parco M, Grossin D et al. SURFACE AND COATING TECHNOLOGY, volume 8-9 pages: 2346-235 (2012)
3. Bioactive Ceramics - physical chemistry, Rey C, Combes C, Drouet C, Grossin D in Comprehensive Biomaterials, Edited By Paul Ducheyne et al. , ISBN: 978-0-08-055302-3, Elsevier (2011)
2. Medical Potentialities of Biomimetic Apatites through Adsorption, Ionic Substitution, and Mineral/Organic Associations: Three Illustrative Examples, Al-Kattan, A; Errassifi, F; Grossin D et al. ADVANCED ENGINEERING MATERIALS Volume: 12 Issue: 7 Pages: B224-B233 (2010)
1. Biomimetic apatite sintered at very low temperature by spark plasma sintering: Physico-chemistry and microstructure aspects, Grossin, D; Rollin-Martinet, S; Estournes, C, et al. ACTA BIOMATERIALIA Volume: 6 Issue: 2 Pages: 577-585 (2010)

Articles 2010-2020

Adamiano, Alessio, Nicola Sangiorgi, Simone Sprio, Andrea Ruffini, Monica Sandri, Alessandra Sanson, Pierre Gras, et al. 'Biom mineralization of a Titanium-Modified Hydroxyapatite Semiconductor on Conductive Wool Fibers'. *Journal of Materials Chemistry B* 5, no. 36 (20 September 2017): 7608–21. <https://doi.org/10.1039/C7TB00211D>.

Al-Kattan, Ahmed, Farid Errassifi, Anne-Marie Sautereau, Stephanie Sarda, Pascal Dufour, Allal Barroug, Isabelle Dos Santos, et al. 'Medical Potentialities of Biomimetic Apatites through Adsorption, Ionic Substitution, and Mineral/Organic Associations: Three Illustrative Examples'. *Advanced Engineering Materials* 12, no. 7 (1 July 2010): B224–33. <https://doi.org/10.1002/adem.200980084>.

Brouillet, Fabien, Danièle Laurencin, David Grossin, Christophe Drouet, Claude Estournes, Geoffroy Chevallier, and Christian Rey. 'Biomimetic Apatite-Based Composite Materials Obtained by Spark Plasma Sintering (SPS): Physicochemical and Mechanical Characterizations'. *Journal of Materials Science: Materials in Medicine* 26, no. 8 (14 August 2015): 1–11. <https://doi.org/10.1007/s10856-015-5553-9>.

Cegla, Rabea-Naemi Rosa, Innocent J. Macha, Besim Ben-Nissan, David Grossin, Greg Heness, and Ren-Jei Chung. 'Comparative Study of Conversion of Coral with Ammonium Dihydrogen Phosphate and Orthophosphoric Acid to Produce Calcium Phosphates'. *Journal of the Australian Ceramics Society Volume* 50, no. 2 (2014): 154–161.

Chambard, Marine, O. Marsan, C. Charvillat, D. Grossin, P. Fort, C. Rey, F. Gitzhofer, and G. Bertrand. 'Effect of the Deposition Route on the Microstructure of Plasma-Sprayed Hydroxyapatite Coatings'. *Surface and Coatings Technology*, 8th Rencontres Internationales de la Projection Thermique, 371 (15 August 2019): 68–77. <https://doi.org/10.1016/j.surfcoat.2019.01.027>.

Champion, Eric, Chantal Damia, Marylène Viana, K. Beaubrun-Giry, C. Drouet, and D. Grossin. 'Elaboration de Biocéramiques Phosphocalciques'. Edited by J. Chone, J.-D. Guerin, and P. Quaegebeur. *MATEC Web of Conferences* 7 (2013): 04010. <https://doi.org/10.1051/mateconf/20130704010>.

Charoensuk, Thanida, Chitnarong Sirisathitkul, Upsorn Boonyang, Innocent J. Macha, Jerran Santos, David Grossin, and Besim Ben-Nissan. 'In Vitro Bioactivity and Stem Cells Attachment of Three-Dimensionally Ordered Macroporous Bioactive Glass Incorporating Iron Oxides'. *Journal of Non-Crystalline Solids* 452 (15 November 2016): 62–73. <https://doi.org/10.1016/j.jnoncrysol.2016.08.019>.

Demnati, Imane, David Grossin, Christèle Combes, and Christian Rey. 'Plasma-Sprayed Apatite Coatings: Review of Physical-Chemical Characteristics and Their Biological Consequences'. *Journal of Medical and Biological Engineering* 34, no. 1 (2014): 1–7. <https://doi.org/10.5405/jmbe.1459>.

Demnati, Imane, David Grossin, Combes Combes, Maria Parco, Inigo Braceras, and Christian Rey. 'A Comparative Physico-Chemical Study of Chlorapatite and Hydroxyapatite: From Powders to Plasma Sprayed Thin Coatings'. *Biomedical Materials* 7, no. 5 (1 October 2012): 054101. <https://doi.org/10.1088/1748-6041/7/5/054101>.

Demnati, Imane, David Grossin, Farid Errassifi, Combes Combes, Christian Rey, and Nadine Le Bolay. 'Synthesis of Fluor-Hydroxyapatite Powder for Plasma Sprayed Biomedical Coatings: Characterization and Improvement of the Powder Properties'. *Powder Technology*, Innovative processes and materials Innovative processes, 255 (March 2014): 23–28. <https://doi.org/10.1016/j.powtec.2013.10.022>.

Demnati, Imane, David Grossin, Olivier Marsan, Ghislaine Bertrand, Gérard Collonges, Christèle Combes, Maria Parco, et al. 'Comparison of Physical-Chemical and Mechanical Properties of Chlorapatite and

Hydroxyapatite Plasma Sprayed Coatings'. *The Open Biomedical Engineering Journal* 9, no. suppl. 1-M3 (2015): 26–39. <https://doi.org/10.2174/1874120701509020026>.

Demnati, Imane, David Grossin, Veronique Santran, Gérard Collonges, Christèle Combes, and Christian Rey. 'Chlorapatite Coated Titanium Dental Implants: An Alternative to Hydroxyapatite'. In *European Cells and Materials*, 27 suppl. 1:9. European Cells and Materials. Toulouse, France: European Cells and Materials, 2014. <http://www.ecmjournals.org/journal/supplements/vol027supp01/pdf/Vol027Suppl1a009.pdf>.

Demnati, Imane, Maria Parco, David Grossin, I. Fagoaga, Christophe Drouet, G. Barykin, Christèle Combes, Inigo Braceras, tephane Goncalves, and Christian Rey. 'Hydroxyapatite Coating on Titanium by a Low Energy Plasma Spraying Mini-Gun'. *Surface and Coatings Technology* 206, no. 8–9 (15 January 2012): 2346–53. <https://doi.org/10.1016/j.surfcoat.2011.10.025>.

Dinh, Thi Mai Thanh, Thi Thom Nguyen, Thi Nam Pham, Thu Phuong Nguyen, Thi Thu Trang Nguyen, Thai Hoang, David Grossin, Ghislaine Bertrand, and Christophe Drouet. 'Electrodeposition of HAp Coatings on Ti6Al4V Alloy and Its Electrochemical Behavior in Simulated Body Fluid Solution'. *Advances in Natural Sciences: Nanoscience and Nanotechnology* 7, no. 2 (2016): 025008. <https://doi.org/10.1088/2043-6262/7/2/025008>.

Drouet, Christophe, Maëllenn Aufray, Sabrina Rollin-Martinet, Nicolas Vandecandelaère, David Grossin, Fabrice Rossignol, Eric Champion, Alexandra Navrotsky, and Christian Rey. 'Nanocrystalline Apatites: The Fundamental Role of Water'. *American Mineralogist* 103, no. 4 (25 April 2018): 550–64. <https://doi.org/10.2138/am-2018-6415>.

Drouet, Christophe, David Grossin, Christèle Combes, Stéphanie Sarda, Sophie Cazalbou, and Christian Rey. 'Apatites biomimétiques - Des biominéraux aux analogues de synthèse pour le biomédical', 2018, 30.

Drouet, Christophe, Christian Rey, Christèle Combes, Sophie Cazalbou, Stéphanie Sarda, and David Grossin. 'Nanocrystalline Apatites: A Versatile Functionalizable Platform for Biomedical Applications for Bone Engineering... and Beyond'. *Key Engineering Materials*, Bioceramics 27, 696 (2016): 14–22. <https://doi.org/10.4028/www.scientific.net/KEM.696.14>.

El-Bachawati, Makrham, David Grossin, Fabien Brouillet, Christophe Drouet, and Christian Rey. 'Matériaux Composites à Matrice Minérale Apatitique Biomimétique Pour La Substitution Osseuse'. In *Proceeding Du Congrès PMF 2011*. Saint-étienne, 2011.

Estournes, C., D. Oquab, S. Selezneff, M. Boidot, D. Monceau, D. Grossin, C. Drouet, et al. 'Shaping of Nanostructured Materials or Coatings through Spark Plasma Sintering'. Edited by T. Chandra, M. Ionescu, and D. Mantovani. *Thermec 2011, Pts 1-4* 706–709 (2012): 24–30. <https://doi.org/10.4028/www.scientific.net/MSF.706-709.24>.

Faivre, Frédéric, Loszach Max, Bertrand Ghislaine, Gitzhofer François, Alexis Joel, Pecune Jade, Grossin David, and Rey Christian. 'Structural and Mechanical Characterizations of Nano Calcium Phosphate Coatings Prepared by Induction Suspension Plasma Spray (Rf-SPS)'. In *Frontiers in Bioengineering and Biotechnology*, Vol. 4, 2016. <https://doi.org/10.3389/conf.FBIOE.2016.01.02829>.

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Fontaine, Laura, Mallorie Tourbin, Fabien Brouillet, Nicole Rouquet, David Grossin, and Christine Frances. 'Effet des conditions de synthèse sur l'agglomération d'hydroxyapatite stœchiométrique'. In *Récents Progrès en Génie des Procédés*, Vol. 107. Nancy: SFGP, 2015.

Gross, K. A., A. Jeršova, D. Grossin, C. Rey, and A. Vīksna. 'Formation of Nanosized Strontium Substituted Hydroxyapatites'. *IOP Conference Series: Materials Science and Engineering* 38, no. 1 (20 August 2012): 012032. <https://doi.org/10.1088/1757-899X/38/1/012032>.

Grossin, David. 'Synthèse, Mise en forme et Caractérisation de phosphates de calcium pour applications biomédicales'. Habilitation à diriger des recherches, Institut Nationale Polytechnique de Toulouse, 2016.

Grossin, David, Sabrina Rollin-Martinet, Claude Estournès, Fabrice Rossignol, Eric Champion, Christèle Combes, Christian Rey, Chevallier Geoffroy, and Christophe Drouet. 'Biomimetic Apatite Sintered at Very Low Temperature by Spark Plasma Sintering: Physico-Chemistry and Microstructure Aspects'. *Acta Biomaterialia* 6, no. 2 (February 2010): 577–85. <https://doi.org/10.1016/j.actbio.2009.08.021>.

Kergourlay, Emmanuelle, David Grossin, Nuria Cinca, Claudie Josse, Sergi Dosta, Ghislaine Bertrand, Irene Garcia, Jose Maria Guilemany, and Christian Rey. 'First Cold Spraying of Carbonated Biomimetic Nanocrystalline Apatite on Ti6Al4V: Physical–Chemical, Microstructural, and Preliminary Mechanical Characterizations'. *Advanced Engineering Materials* 18, no. 4 (1 April 2016): 496–500. <https://doi.org/10.1002/adem.201500409>.

Luginina, Marina, Roberto Orru, Giacomo Cao, David Grossin, Fabien Brouillet, Geoffroy Chevallier, Carole Thouron, and Christophe Drouet. 'First Successful Stabilization of Consolidated Amorphous Calcium Phosphate (ACP) by Cold Sintering: Toward Highly-Resorbable Reactive Bioceramics'. *Journal of Materials Chemistry B*, 28 November 2019. <https://doi.org/10.1039/C9TB02121C>.

Macha, Innocent, David Grossin, and Besim Ben-Nissan. 'Conversion of Marine Structures to Calcium Phosphate Materials: Mechanisms of Conversion Using Two Different Phosphate Solutions.' *Key Engineering Materials*, Bioceramics 27, 696 (2016): 36–39. <https://doi.org/10.4028/www.scientific.net/KEM.696.36>.

Macha, Innocent J., Besim Ben-Nissan, Jerran Santos, Sophie Cazalbou, Artemis Stamboulis, David Grossin, and Gerard Giordano. 'Biocompatibility of a New Biodegradable Polymer-Hydroxyapatite Composite for Biomedical Applications'. *Journal of Drug Delivery Science and Technology* 38 (April 2017): 72–77. <https://doi.org/10.1016/j.jddst.2017.01.008>.

Macha, Innocent J., Upsorn Boonyang, Sophie Cazalbou, Besim Ben-Nissan, Cedric Charvillat, Faik N. Oktar, and David Grossin. 'Comparative Study of Coral Conversion, Part 2: Microstructural Evolution of Calcium Phosphate'. *Journal of The Australian Ceramic Society Volume* 51, no. 2 (2015): 149–159.

Macha, Innocent J., Cedric Charvillat, Sophie Cazalbou, David Grossin, Upsorn Boonyang, and Besim Ben-Nissan. 'Comparative Study of Coral Conversion, Part 3: Intermediate Products in the First Half an Hour'. *Journal of The Australian Ceramic Society Volume* 52, no. 1 (2016): 177–182.

Nam, Pham Thi, Tran Dai Lam, Ho Thu Huong, Nguyen Thu Phuong, Nguyen Thi Thu Trang, Thai Hoang, Nguyen Thi Thanh Huong, et al. 'Electrodeposition and Characterization of Hydroxyapatite on TiN/316LSS'. *Journal of Nanoscience and Nanotechnology* 15, no. 12 (1 December 2015): 9991–10001. <https://doi.org/10.1166/jnn.2015.10329>.

Otsuka, Yuta, Masaki Takeuchi, Makoto Otsuka, Besim Ben-Nissan, David Grossin, and Hideji Tanaka. 'Effect of Carbon Dioxide on Self-Setting Apatite Cement Formation from Tetracalcium Phosphate and Dicalcium Phosphate Dihydrate; ATR-IR and Chemoinformatics Analysis'. *Colloid and Polymer Science* 293, no. 10 (2 July 2015): 2781–88. <https://doi.org/10.1007/s00396-015-3616-6>.

Rey, Christian, Christèle Combes, Christophe Drouet, Sophie Cazalbou, David Grossin, Fabien Brouillet, and Stéphanie Sarda. 'Surface Properties of Biomimetic Nanocrystalline Apatites; Applications in Biomaterials'. *Progress in Crystal Growth and Characterization of Materials* 60, no. 3–4 (September 2014): 63–73. <https://doi.org/10.1016/j.pcrysgrow.2014.09.005>.

Rodriguez, Gabriela Melo, James Bowen, David Grossin, Besim Ben-Nissan, and Artemis Stamboulis. 'Functionalisation of Ti6Al4V and Hydroxyapatite Surfaces with Combined Peptides Based on KKLPGA and EEEEEEEE Peptides'. *Colloids and Surfaces B: Biointerfaces* 160 (1 December 2017): 154–60. <https://doi.org/10.1016/j.colsurfb.2017.09.022>.

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Tourbin, M., F. Brouillet, B. Galey, N. Rouquet, P. Gras, N. Abi Chebel, D. Grossin, and C. Frances. 'Agglomeration of Stoichiometric Hydroxyapatite: Impact on Particle Size Distribution and Purity in the Precipitation and Maturation Steps'. *Powder Technology* 360 (15 January 2020): 977–88. <https://doi.org/10.1016/j.powtec.2019.10.050>.

Visan, A., D. Grossin, N. Stefan, L. Duta, F. M. Miroiu, G. E. Stan, M. Sopronyi, et al. 'Biomimetic Nanocrystalline Apatite Coatings Synthesized by Matrix Assisted Pulsed Laser Evaporation for Medical Applications'. *Materials Science and Engineering B-Advanced Functional Solid-State Materials* 181 (February 2014): 56–63. <https://doi.org/10.1016/j.mseb.2013.11.007>.

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Visan, A., G. E. Stan, C. Ristoscu, G. Popescu-Pelin, M. Sopronyi, C. Besleaga, C. Luculescu, et al. 'Combinatorial MAPLE Deposition of Antimicrobial Orthopedic Maps Fabricated from Chitosan and Biomimetic Apatite Powders'. *International Journal of Pharmaceutics* 511, no. 1 (10 September 2016): 505–15. <https://doi.org/10.1016/j.ijpharm.2016.07.015>

Book Chapter 2010-2020

Rey, C., C. Combes, C. Drouet, and D. Grossin. '1.111 - Bioactive Ceramics: Physical Chemistry'. In *Comprehensive Biomaterials*, edited by Paul Ducheyne, 187–221. 1.111. Oxford: Elsevier, 2011. <http://www.sciencedirect.com/science/article/pii/B9780080552941000234>.

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