

Curriculum Vitae

Personal data

Name: Gan Zhang

Gender: male

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Address: Gordon Street, No.5, Rehovot, Israel

Languages: Chinese (Native proficiency), English (Professional proficiency), Spanish (Elementary proficiency).

Academic Background:

October 2019 – present	Postdoctoral researcher in Department of Chemistry, Ben-Gurion University of the Negev
August 2017 – August 2019	Postdoctoral researcher in Department of Structural Biology, Weizmann Institute of Science, Israel
January 2017 – July 2017	Research technician in Laboratorio de Estudios Cristalográficos, Instituto Andaluz de Ciencias de la Tierra, Granada, Spain.
November 2015 – July 2016	Research technician in Guangxi Colleges and Universities Key Laboratory of Beibu Gulf Oil and Natural Gas Resource Effective Utilization, Qinzhou University, Qinzhou, China.
November 2010 – July 2015	Ph.D. program in Crystallization and Crystallography (Laboratorio de Estudios Cristalográficos, Instituto Andaluz de Ciencias de la Tierra (CSIC - UGR), Granada, Spain). Thesis supervised by Prof. Juan Manuel García-Ruiz. Nov. 2012 – Jan. 2013, Visiting Ph.D. student in Department of Chemistry, Università di Bologna, Bologna, Italy. Project hosted by Prof. Giuseppe Falini & Dr. Marco Montalti.
September 2009 – August 2010	MSc program in Crystallization and Crystallography (Universidad

- Internacional Menéndez Pelayo, Granada & Seville, Spain). Master thesis supervised by Prof. Juan Manuel García-Ruiz.
- September 2007 – July 2009 MSc program in Chemistry, Design and Synthesis (Leiden University, Leiden, Netherlands). Study supervised by Dr. Alexander Kros.
- Feb. 2009 – Jun. 2009, Visiting student of Erasmus exchange project in Department of Physical Chemistry, Universidad de Alcalá, Madrid, Spain. Project hosted by Dr. Gemma Montalvo García.
- September 2003 – July 2007 BSc program in Chemistry (Nankai University, Tianjin, China). Bachelor thesis supervised by Prof. Tie-Hong Chen.

Research descriptions:

Silica biomorphs are composed of highly ordered nanoscale subunits through self-organized processes, exhibiting complex non-crystallographic morphologies and biomimetic microarchitectures. These abiotic “life-like” materials were obtained by precipitation of alkaline earth metal carbonates (BaCO_3 , SrCO_3 and CaCO_3) in alkaline silica-rich media, where silica played a key role on the structure directing and morphogenesis. This phenomenon is considered as an important laboratory model for developing straightforward bottom-up strategies towards the design of biomimetic materials. My PhD thesis entitled “Morphogenesis of self-assembled crystalline materials of calcium carbonate and silica”, mainly focused on the polymorphic and morphological control of the crystallization of calcium carbonate and the hydrate forms in aqueous alkaline silica-rich media, to explore the morphogenetic mechanism of silica biomorphs and to generate materials with assembled multiscale architectures with high levels of complexity and precision.

Organic crystals are used by organisms to produce a remarkable array of optical phenomena based on the reflection and scattering of light. By varying the size, morphology and the ultrastructure of the crystals and the biological tissues, the light is manipulated by different way and therefore leads to various optical functions to the organisms. My postdoctoral research focused on the determination of the chemical compositions of the biogenic organic crystals and the related ultrastructure in the eye of fish. This study was carried on by a series of chemical characterizations and the cryo-SEM imaging, which allows us to better understand how the fish use the organic crystals for the vision. The current research focus on the biogenic reflective particles (pigments) in butterfly and hornet, to explore more optically functional organic crystals in nature.

Awards:

Dean postdoctoral grant, 2017-2019 by Weizmann Institute of Science.

Cum Laude of PhD thesis, 2015 by Menéndez Pelayo International University and Spanish National Research Council.

CSIC JAE-PRE PhD grant, 2010-2014 by Spanish National Research Council.

Participation in research projects:

February 3rd, 2010 – February 2nd, 2014, Tecnología Cristalográfica: Contribuyendo al Desarrollo Socioeconómico en y desde Andalucía.

Financial support from Plan Andaluz de Investigación.

Principal investigator: Juan Manuel García-Ruiz

August 1st, 2015 – July 6th, 2015, and January 9th, 2017 – July 30th, 2017, Pattern formation and mineral self-organization in highly alkaline natural environments.

Financial support from ERC Advanced Grant.

Principal investigator: Juan Manuel García-Ruiz

August 7th 2017 – August 16th, 2019, Molecular, Structural and Functional Investigation of Biological Reflectors.

Financial support from Israel Science Foundation.

Principal Investigator: Lia Addadi

October 1st 2019 – present, Biogenic Organic Crystals: From Crystal Formation to Genetically Engineered Optical Materials.

Financial support from ERC Starting Grant.

Principal Investigator: Benjamin A. Palmer

Publication:

G. Zhang, J. M. Delgado-López, D. Choquesillo-Lazarte, J. M. García-Ruiz. Crystallization of monohydrocalcite in a silica-rich alkaline solution. *CrystEngComm*, 2013, 15, 6526-6532. Impact factor: 3.382

Montalvo G, Pons R, **Zhang G**, Díaz M, Valiente M. Structure and Phase Equilibria of the Soybean Lecithin/PEG 40 Monostearate/Water System. *Langmuir*, 2013, 29, 14369–14379. Impact factor: 3.683

Gan Zhang, J. M. Delgado-López, D. Choquesillo-Lazarte, J. M. García-Ruiz. Growth Behavior of Monohydrocalcite (CaCO₃·H₂O) in Silica-Rich Alkaline Solution. *Crystal Growth & Design*, 2015, 15 (2), 564–572. Impact factor: 4.153

M. Montalti, **G. Zhang**, D. Genovese, J. Morales, M. Kellermeier, J. M. García-Ruiz. Local pH Oscillations Witness Autocatalytic Self-Organization of Biomorphic Nanostructures. *Nature Communications*, 2017, 8, 14427. Impact factor: 11.880

G. Zhang, J. Morales, J. M. García-Ruiz. Growth Behaviour of Silica/Carbonate Nanocrystalline Composites of Calcite and Aragonite. *Journal of Materials Chemistry B*, 5 (2017) 1658-1663. Impact factor: 4.776

Gan Zhang, Cristobal Verdugo-Escamilla, Duane Choquesillo-Lazarte, Juan Manuel García-Ruiz. Thermal assisted self-organization of calcium carbonate. *Nature Communications*, 2018, 9, 5221. Impact factor: 11.880

Gan Zhang, Anna Hirsch, Guy Shmul, Liat Avram, Nadav Elad, Vlad Brumfeld, Iddo Pinkas, Yishay Feldman, Raz Ben Asher, Benjamin A. Palmer, Leeor Kronik, Leslie Leiserowitz, Steve Weiner, Lia Addadi. Guanine and 7,8-Dihydroxanthopterin Reflecting Crystals in the Zander Fish Eye: Crystal Locations, Compositions, and Structures. *Journal of the American Chemical Society*, 2019 (In press). Impact factor: 14.695

Attended conferences:

Encuentro en la UIMP sobre posgrado: calidad con dimensión internacional. Las Escuelas de Doctorado.

July 4th – July 8th, 2011, Santander, Spain, oral presentation.

XXII Congress and General Assembly of the International Union of Crystallography.

August 22th – August 30th, 2011, Madrid, Spain, poster.

XXII Simposio del Grupo Especializado de Cristalografía y crecimiento cristalino.

June 26th – June 29th, 2012, Seville, Spain, oral presentation and poster

15th Summer School on Crystal Growth - ISSCG-15

August 4th – August 10th, 2013, Gdansk, Poland, poster.

The 17th International Conference on Crystal Growth and Epitaxy (ICCGE-17)

August 11st – August 16th, 2013, Warsaw, Poland, poster.

La XXXV Reunión de la Sociedad Española de Mineralogía.

June 30th – July 3rd, 2015, Huelva, Spain, oral presentation.

International School of Crystallization 2018

May 21st – May 25th, 2018, Granada, Spain, invited presentation.

2018 Biomineralization Conference GRC

July 29th – August 3rd, 2018, New London, United State, poster.

Bioinspired Materials 2019

October 20th – October 25th, 2019, Ascona, Switzerland, poster.

Research Expertise and Interest:

Cryo-SEM, TEM/Electron diffraction, Raman microscope, Mass spectroscopy, fluorescence microscopy.

Crystallization and Crystallography, Biomineralization and biomimetic crystallization, Biological photonic materials.