

Patrick Cordier

Professor, University of Lille
Villeneuve d'Ascq, France

Current Position

Professor of Physics, University of Lille (France) and Institut Universitaire de France
Laboratory: Unité Matériaux et Transformations (UMR CNRS 8207)

Education

- Habilitation (HDR), Physical Sciences, University of Lille, 1995
- PhD, Materials Science, University of Lille, 1989
- Engineering Degree in Materials Science (EUDIL / Polytech Lille), 1985

Professional Experience

- Professor, University of Lille (since 1996)
- Visiting Professor, Université catholique de Louvain (since 2019)
- Senior Member, Institut Universitaire de France (since 2019)
- Associate Professor, University of Lille (1989–1996)
- Research Associate, Case Western Reserve University (USA), 1989

Research Summary

My research focuses on the physics of plastic deformation in minerals and materials, combining transmission electron microscopy, high-pressure experiments, and multiscale modeling.

I have contributed to understanding deformation mechanisms in Earth's mantle minerals, including the first characterization of dislocations in bridgmanite. My work also addresses shock metamorphism, grain boundary processes, and multiscale modeling of creep, notably through ERC Advanced Grants (RheoMan, TimeMan).

This research aims to bridge microscopic mechanisms and macroscopic rheology across a wide range of conditions.

Selected Publications

- Coulombier *et al.* (2024) *Acta Mat.* – nanomechanical testing, rheology at ultra low strain rate
- Cordier *et al.* (2023) *Nature* – Rheology of MgO and bridgmanite at mantle conditions
- Samae *et al.* (2021) *Nature* – Stress-induced amorphization olivine
- Cordier *et al.* (2014) *Nature* – Disclinations in olivine deformation
- Castelnau *et al.* (2020) *CR Mécanique* – Multiscale modeling rheology wadsleyite
- Idrissi *et al.* (2016) *Science Advances* – Plasticity of olivine *in situ* in the TEM

- Kraych *et al.* (2016) EPSL – Dislocation glide in bridgmanite
- Boioli *et al.* (2015) Physical Review B – Dislocation dynamics in olivine

(~225 peer-reviewed publications; h-index ~52 (Google scholar))

Honors and Awards

- ERC Advanced Grants: RheoMan (2011), TimeMan (2018)
- Fellow, American Geophysical Union (2019)
- Member, Academia Europaea (2022)
- Dana Medal, Mineralogical Society of America (2016)
- Fellow, Mineralogical Society of America (2008)
- Grand Prix Kuhlmann, SSAAL (2015)

Professional Service and Leadership

- President, International Mineralogical Association (2019–2020)
- President, French Society of Mineralogy and Crystallography (2008–2009)
- Editor-in-Chief, European Journal of Mineralogy (2012–2021)
- Associate Editor, American Mineralogist (2015–2018)

Professional Memberships

- American Geophysical Union (AGU)
- Mineralogical Society of America (MSA)
- European Mineralogical Union (EMU)
- International Mineralogical Association (IMA)