

CURRICULUM VITAE

Frederic MONTEVERDE

Short Biosketck

Frederic Monteverde is a Senior Researcher in the Institute of Science, Technology and Sustainability for Ceramics (ISSMC) at the National Research Council of Italy (CNR). He earned a degree in Physics at the University of Bologna in 1990. He got a permanent position in 1994 at ISSMC-CNR. His current research focuses on the synthesis, processing, characterization, and properties of structural ceramics, in particular ultra-high temperature ceramics. He has published more than 90 papers in peer-reviewed journals and given several (invited) presentations on his research.

Current position in ISSMC and main role

Senior researcher; PI of R&D research projects and contracts.

Scientific skills

- Design, production and study of structural ceramics for harsh environments.
- Development of self-healing ceramics and composites.
- Design, production and study of ultra refractory high entropy ceramics
- Design, production and study of high entropy ceramics for energy saving and catalysis.
- Characterization of the degradation in structural ceramics exposed to very aggressive conditions of temperature (i.e., aerothermal heating).

Main characterization techniques

- Optical microscopy, scanning electron microscopy, energy dispersive spectroscopy, x-ray diffraction, thermal analysis, mechanical properties.

Main current collaborations

Dipartimento di Ingegneria Industriale – Sez. Aerospaziale, Università di Napoli “Federico II”;
Missouri Science & Technology University (Rolla, US).

Recent featured research products

a) International Journals

- S.Mungiguerra, A.Cecere, R.Savino, F.Saraga, **F.Monteverde**, D.Sciti, Improved aero-thermal resistance capabilities of ZrB₂-based ceramics in hypersonic environment for increasing SiC content, Corrosion Science 178, 109067 (2021).
- L.Feng, W.Fahrenholtz, G.Hilmas, **F.Monteverde**, Effect of Nb content on the phase composition, densification, microstructure, and mechanical properties of high-entropy boride ceramics, Journal of the European Ceramic Society 41 (1), 92-100 (2021).
- **F.Monteverde**, F.Saraga, T.Reimer, D.Sciti, Thermally stimulated self-healing capabilities of ZrB₂-SiC ceramics, Journal of the European Ceramic Society 41 (15), 7423-7433 (2021).

- L.Feng, **F.Monte Verde**, W.G. Fahrenholtz, G.E. Hilmas, Superhard high-entropy AlB₂-type diboride ceramics, *Scripta Materialia* 199, 113855 5 (2021).
- **F.Monte Verde**, F.Saraga, M.Gaboardi, L.Feng, G.Hilmas, W.Fahrenholtz, Quantitative inspection of grain-scale chemical inhomogeneities in high-entropy AlB₂-type transition metal diborides, *Journal of the American Ceramic Society* 105 (11), 6910-6923 (2022)
- M.Gaboardi, **F.Monte Verde**, F.Saraga, G.Aquilanti, L.Feng, W.Fahrenholtz, G.Hilmas, Local structure in high-entropy transition metal diborides, *Acta Materialia* 239, 118294 (2022)
- A.Dorner, **F.Monte Verde**, W.Fahrenholtz, G.Hilmas, Solid-state formation mechanisms of core-shell microstructures in (Zr,Ta)B₂ ceramics, *Journal of the American Ceramic Society* 105 (5), 3147-3152 (2022)
- **F.Monte Verde**, M.Gaboardi, F.Saraga, F.Lun, W.Fahrenholtz, G.Hilmas, Anisotropic thermal expansion in high-entropy multicomponent AlB₂-type diboride solid solutions, *International Journal of Extreme Manufacturing Int. J. Extrem. Manuf.* 5 (2023) 015505.
- F.Wang, **F. Monte Verde**, B. Cui, Will high-entropy carbides and borides be enabling materials for extreme environments? *International Journal of Extreme Manufacturing Int. J. Extrem. Manuf.* 5 (2023) 022002.
- S.Cassese, **F.Monte Verde**, G.Gallo, S.Mungiguerra, A.Cecere, F.Saraga, R.Savino, Compositionally complex catalytic oxide beds free of noble metals for H₂O₂ fuelled monopropellant thrusters, *Journal of the European Ceramic Society* 43(11), 4854-4864 (2023).
- **F. Monte Verde**, M. Gaboardi, Entropy-driven expansion of the thermodynamic stability of compositionally complex spinel oxides, *Journal of the European Ceramic Society* 44 (13), 7704-7715 (2025).
- **F. Monte Verde**, C. Pellegrini, M. Balat-Pichelin, W. Fahrenholtz, G. Hilmas, Compositionally complex AlB₂-type diborides in dissociated air plasma, *Journal of the European Ceramic Society* 45 (3), 116963 (2025).

b) Participation in International Conferences/Workshop with oral contribution

- ICC7 Foz do Iguazu (Brazil), 17-21/6/2018: Novel hybrid materials with added-value functionalities for applications in extreme environments, *invited*.
- HTCMC-10th Bordeaux (France), 22-26/9/2019, Retained strength of UHTCMCs treated above 2273 K in oxidizing environment.
- UHTCs for Extreme Environment Applications V (June 2022, Snowbird Utah - USA): Local versus long-range structure in high entropy diboride solid solutions.
- MS&T 22 - ACerS Robert B. Sosman Award Symposium: Session II – October 2022, Pittsburgh, High-entropy transition metal diborides: local structure vs. long-range chemical homogeneity, *invited*.
- PACRIM 15th – November 2023, Shenzhen (China): Entropy-driven expansion of the thermodynamic stability of compositionally complex ceramics, *keynote*
- Ultra-High Temperature Ceramics: Materials for Extreme Environment Applications VI – April 2024, Giardini Naxos (Italy): Testing compositionally complex diboride ceramics up to 2500K in dissociated air plasma.
- ECERS XIX – Dresden (Germany), 1-4/9/2025: Compositionally complex transition metal diborides for future space exploration.