European Research Council
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Post-doctoral position in MAS DNP of crystallizing solutions at the CNRS - Marseille(France)

A CNRS post-doctoral research position funded by the European Research Council (ERC) is available in the NMR DNP group of the Institut de Chimie Radicalaire in Marseille, France (**www.mollicalab.fr**).

The overall aim of the project is to develop and apply an emerging NMR hyperpolarization technique, namely magic-angle spinning nuclear dynamic polarization (MAS-DNP) to characterize the process of formation of polymorphic organic solids.

The main challenge will consist in developing new experimental approaches in solid-state NMR and MAS DNP to maximize the sensitivity of the technique for the study of systems undergoing crystallization. To this aim, the candidate will be required to work on the development of new tools to increase the temporal resolution of the analysis of crystallizing solutions and allow the selection of polymorphs by NMR DNP.

The research project will focus more specifically on the following aspects:

1. the development and application of new experimental protocols to trap metastable phases formed during crystallization processes
2. the development and/or optimization of MAS DNP experiments for the detection and structural characterization of these phases.

Host laboratory & research environment

The project will take place at the Institut de Chimie Radicalaire de Marseille (ICR, UMR 7273, https://icr.univ-amu.fr/en/), within the solid-state DNP NMR research group. Located in the south of France in Marseille, the ICR is internationally recognized for its double expertise in i) the development of new DNP approaches for the characterization of organic solids and ii) the synthesis of radical species currently used as polarizing agents the most effective for the analysis of solids via MAS DNP. The laboratory has free access to high performance computing facilities through the Mesocentre of Aix-Marseille Université. With the Spectropole analytical facility on-site, ICR has access to a wide range of instruments for material analysis, and several NMR spectrometers for liquids and solids with magnetic fields ranging between 300 and 600 MHz. In particular, the laboratory is equipped with a 400 MHz MAS-DNP spectrometer as well as with a 400 MHz wide bore NMR spectrometer with numerous MAS probes up to 60 kHz.

The selected candidate will interact on a day-to-day basis with a team of researchers and students as well as with scientists with whom the team has established collaborations, both nationally and internationally.

Qualifications & application procedure

This offer is open to candidates with a training in physical chemistry or materials chemistry, holding a PhD in the field of solid-state NMR. The ideal candidate is expected to be curious and motivated, capable of working on an interdisciplinary project, and should demonstrate excellent communication skills (both oral and written), notably in English. French is not required.

The expected starting date is between October 2022 and January 2023.

The postdoctoral position is funded by the CNRS initially for one year. Salary is commensurate to experience (2743 et 3896 € gross/month). Applications will be considered on a rolling basis.

The CNRS is labeled HR Excellence for Research (HRS4R) and promotes the transparency of the recruitment process and equal opportunities.

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Related publications from the group

- M. Juramy, R. Chèvre, P. Cerreia-Vioglio, F. Ziarelli, E. Besson, S. Gastaldi, S. Viel, P. Thureau, K. D. M. Harris, G. Mollica
  Monitoring crystallization processes in confined porous materials by dynamic nuclear polarization solid-state nuclear magnetic resonance
  J. Am. Chem. Soc. 2021, 143, 6095.
- P. Cerreia-Vioglio, P. Thureau, M. Juramy, F. Ziarelli, S. Viel, P. A. Williams, C. E. Hughes, K. D. M. Harris, G. Mollica
  A strategy for probing the evolution of crystallization processes by low-temperature solid-state NMR and dynamic nuclear polarization
  J. Phys. Chem. Lett. 2019, 10, 1505.
- P. Cerreia Vioglio, G. Mollica, M. Juramy, C. E. Hughes, P. A. Williams, F. Ziarelli, S. Viel, P. Thureau, K. D. M. Harris
  Insights into the crystallization and structural evolution of glycine dihydrate by in situ solid-state NMR spectroscopy
  Angew. Chem. Int. Ed. 2018, 57, 6619.