

IMPERIAL

PhD Project Description

Project Title

Meteorites and their organic records of the early solar system

Supervisors

Lead Supervisor: Mark A. Sephton

Co-supervisor(s): Jonathan Watson

Research Group

Organic Geochemistry

Project Summary

Some meteorites contain several percent organic matter. The vast majority of this organic matter is a complex organic network or macromolecule. The macromolecule is made up of organic building blocks, each of which has a story to tell about chemical evolution in the early solar system just prior to the origin of life on Earth

This project will separate the macromolecules in primitive meteorites into their constituent units. Once prepared, the liberated organic compounds will be analysed using a battery of techniques to read their record of primordial chemical evolution. The work is designed to yield high profile publications that reveal insights into the type of reactions that led to life's first chemical steps.

Inquiries are welcome and can be directed to Professor Mark A. Sephton, email:

m.a.sephton@imperial.ac.uk

Research Context and Objectives

- Investigate the origin of organic matter in meteorites
- Use advanced techniques to study information-rich large molecules
- Reveal the geochemical conditions that directly preceded life
- Receive training in Organic Geochemistry

Collaborators and partners on the project:

Optional

Further reading:

Optional

Who are we looking for?

The project would suit candidates with a background in earth science, planetary science, chemistry or a subject that develops similar skills. Full training in all necessary techniques will be provided.

Commented [ML1]: Highly recommend to keep the entire document no longer than two pages, using an easily readable font size to keep it concise and accessible. Once completed, remove all comments and save the document as a PDF with a clear and easily identifiable file name.

Commented [ML2]: A concise and descriptive title that captures the essence of the research.

Commented [ML3]: Include here any relevant affiliations to research group, any useful links providing more information about your group and project.

Commented [ML4]: A short overview (approx. 150–200 words) suitable for the department's website facing the general public. Write in accessible language, avoiding excessive technical detail. Explain what the project is about, why it matters, and what the student will gain from it.

Commented [ML5]: Provide a concise overview of the scientific background, the key research questions, and the motivation behind the project. You may include figures or images to help illustrate the research area or objectives. Recommended length is up to two pages for the entire document.

Commented [ML6]: Are there any exciting collaborations or partners related to this project?

Commented [ML7]: Relevant papers or books to help students better understand the background and objectives of the project. We recommend no more than 5 sources.

Commented [ML8]: Candidate Profile
Specify what kind of student would be well suited for the project. This might include:

- **Academic background** – e.g. geoscience, engineering, physics, environmental science, computer science, etc.
- **Essential skills or experience** – e.g. data analysis, programming, lab techniques, fieldwork, numerical modelling, etc.
- **Desirable attributes** – e.g. curiosity, problem-solving ability, independence, teamwork, communication skills.
- **Training opportunities** – note what skills or experiences the student will gain through this project.