

Senior Scientist, Encapsulation & Dispersion

(We will also consider exceptional early-career PhD scientists at Scientist level.)

Location: Cambridge, UK. On-site, laboratory-based. **Reports to:** [CTO / Head of R&D]

Type: Full-time, permanent

About us

CPT is a Cambridge deep-tech company developing advanced materials that improve the performance of silicon photovoltaic modules. Our materials are incorporated into the module during manufacture and deliver a performance gain without requiring changes to the underlying solar cell. We are moving from laboratory proof-of-concept towards product, and this role is central to bringing our materials into a manufacturable form.

The role

You will be responsible for the encapsulation and dispersion workstream. The objective is to develop methods to package our proprietary organic molecules and nanoparticles into stable core-shell particles or micelles, most likely with a silica or metal-oxide shell, that protect the active materials and preserve their performance. You will then disperse those particles into polymer encapsulant materials such as EVA, POE and EAP, achieving high optical clarity and long-term stability. You will take the process from bench scale towards pilot-scale batches, working closely with our synthesis and characterisation teams.

Key responsibilities

- Design and develop encapsulation routes (self-assembly, emulsion, and sol-gel or metal-oxide shell chemistry) to package the active organic molecules and nanoparticles into stable core-shell particles.
- Engineer barrier shells that protect the active materials against oxygen and moisture and extend their operational lifetime, while preserving their performance and preventing degradation.
- Develop surface functionalisation and coupling chemistry so that particles are compatible with, and resist re-aggregation in, polymer matrices, and control refractive-index matching to minimise scattering and haze.
- Formulate and process dispersions into polymer encapsulants (EVA, POE, EAP), taking account of the relevant crosslinking and lamination conditions.
- Characterise particles and dispersions using appropriate techniques (for example TEM, DLS, zeta potential, SAXS, XPS, FTIR, TGA and UV-Vis) and correlate structure with performance and stability.
- Conduct design-of-experiments process development and scale batches reproducibly from milligram to kilogram quantities, with clear quality control.
- Handle air- and moisture-sensitive materials under inert conditions, and maintain COSHH and safety standards.
- Collaborate across the synthesis and characterisation teams, contribute to the patent portfolio, and maintain rigorous electronic lab-notebook records.
- Shape the encapsulation strategy, advise on equipment and supplier selection, and mentor junior scientists as the team grows.

Essential skills and experience

- A PhD in colloid or physical chemistry, materials science, nanotechnology, chemical engineering or a closely related discipline.
- Demonstrated experience in the self-assembly of micelles or nanoparticles containing active molecules.
- Core-shell encapsulation chemistry, for example silica (sol-gel or Stöber) or metal-oxide shells.
- Surface functionalisation and ligand chemistry, such as silane coupling agents, ligand exchange, and the transfer of nanoparticles between solvent environments.
- A practical command of colloidal stability, including zeta potential, DLVO principles, and the control of aggregation both in suspension and after transfer into another medium.
- A broad nanomaterial characterisation skill set, as noted above.
- A record of preserving the function of an active species through encapsulation, or clear evidence of the aptitude to do so.
- A hands-on, rigorous approach, and comfort working with ambiguity in a fast-moving environment.

Desirable skills

- Dispersion of nanomaterials into polymers or plastics, including melt compounding, extrusion and film processing.
- Knowledge of polymer encapsulant materials (EVA, POE, EAP), their crosslinking chemistry, lamination, and reliability testing.
- Refractive-index matching and the control of optical clarity in filled polymer systems.
- Experience with barrier coatings and familiarity with oxygen and water-vapour transmission.
- Process development and scale-up, supported by design of experiments.
- Awareness of materials-compliance considerations for products entering volume manufacture.

Personal attributes

A curious and pragmatic problem-solver who works well across disciplines, collaborates effectively, communicates clearly, and is motivated to see their science reach a real product. Comfortable owning a workstream and shaping how it is delivered.

What We Offer

- A key role in a high-impact company with the potential for truly global environmental and commercial impact.
- The opportunity to grow with an organisation as its technology goals are achieved.
- A competitive salary and benefits package, commensurate with experience.
- A full-time role (37.5 hour week) based in Cambridge, UK, with 25 days holiday allowance.

How to apply

Interested parties should send a CV and covering letter to careers@cambridgephoton.com