Post-doctoral position

Synthesis, production and analytical characterization of inorganic pigments for the cosmetics industry

Proportion of work : Full time, 24 months, gross monthly salary: €3,017.67
Workplace : Rennes Institute of Chemical Sciences, Rennes, France
Expected date of employment: April 2026

The researcher must not have resided or carried out their main activity (work, studies, etc.) in France for more than 12 months during the 3 years immediately prior to the call deadline and must have obtained their PhD less than three years before the start of the contract.

Context

The cosmetics sector is the second largest contributor to the French trade balance, with approximately 60% of its production exported worldwide, representing a market of €30.4 billion. Sustaining the international competitiveness of French cosmetic products requires continuous innovation in ingredients and processes, while ensuring a high level of safety and addressing environmental and regulatory challenges. In this context, eco-design has become a central strategy, aiming to improve product life cycles, promote mineral or naturally derived raw materials, and reduce reliance on fossil-based resources. These objectives are fully aligned with European initiatives such as the European Green Deal and the Safe and Sustainable by Design (SSbD) framework, which promote the development of materials that are high-performance, safe for consumers and environmentally responsible from the earliest stages of design.

Within this framework, the ICCARE (Innovative Cosmetics for CARE) Joint Laboratory, (CHANEL PB and the Chemical Sciences Institute of Rennes, ENSCR, University of Rennes) brings together academic expertise in solid-state chemistry, inorganic synthesis and green chemistry with industrial know-how in cosmetic product development and scale-up. The overarching ambition is to design next-generation inorganic pigments that are eco-designed, sustainable, compliant with current and future regulatory requirements, and compatible with industrial constraints.

Mission

The recruited postdoctoral researcher will be responsible for the synthesis and characterization of metal oxide pigments produced through innovative, aqueous-based process developed within an eco-responsible approach. The work will focus on achieving fine control over morphological and colorimetric properties, which are key parameters for cosmetic applications, particularly in the field of make-up.

The postdoctoral researcher will also be actively involved in the scale-up of the synthesis process, with special attention paid to industrial reproducibility, a critical requirement for technology transfer. The synthesized oxides will be developed specifically for cosmetic applications, requiring materials that are stable, safe and compatible with formulation constraints.

Activities

The postdoctoral researcher will be expected to:

- propose new experimental strategies and operating conditions based on a critical analysis of the scientific literature and previously obtained results, within the framework of the aqueous synthesis route;
- synthesize and characterize inorganic pigments using complementary solid-state characterization techniques, including X-ray powder diffraction and electron microscopy (SEM/TEM);
- investigate the relationships between synthesis parameters, particle morphology and colorimetric properties;
- correlate experimental observations with thermodynamic data using aqueous-phase speciation software (e.g. Phreeqc or equivalent), in order to improve the understanding of reaction mechanisms and guide process optimization;
- contribute to the assessment of process robustness and reproducibility in view of scale-up toward pilot-scale production.

Required skills

The candidate should have a strong background and demonstrated motivation in inorganic synthesis and solid-state chemistry, together with proven expertise in materials characterization techniques (XRD, SEM, TEM). Knowledge of thermodynamics and experience with chemical speciation software such as Phreeqc (or equivalent) would be considered a strong asset.

The successful candidate will be required to write scientific reports on a regular basis and to present results in English during meetings with the industrial partner. The ability to work effectively within a team, good organizational skills, and a strong command of scientific English are essential.

Working environment

The postdoctoral researcher will be hosted within the Institut des Sciences Chimiques de Rennes, located at the École Nationale Supérieure de Chimie de Rennes. The position involves close and regular interactions with the industrial partner of the Joint Laboratory, based in Paris, within a highly collaborative environment focused on innovation, technology transfer and the development of sustainable cosmetic materials.

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