

Position Profile for Chinese Applicants running for 2019 Helmholtz – OCPC – Program

PART A (Info about the Position)

Helmholtz Centre and institute: DESY, Photon Science

Title of the project: Tracking chirality-induced stereocomplexation in liquid polymers by synchrotron X-ray scattering methods

Project leader: Dr. Chen Shen, Dr. Florian Bertram

Web-address:

http://photon-science.desy.de/facilities/petra_iii/beamlines/p08_highres_diffraction

Description of the project (max. half page):

This project aims at resolving the structural and dynamic details of liquid polymers in presence of chirality using X-ray scattering methods. The post-doc will join the team of the High Resolution Diffraction Beamline P08 at PETRA III, the world-leading synchrotron radiation facility at DESY.

Poly(lactic acid) (PLA) is chosen as the model system, due to its potential use as an environment-friendly material because of its biodegradability. The stereocomplex (sc) of its two chiral varieties (PLLA and PDLA) is known to exist as sc-crystals, that have higher melting point, faster growth rate and smaller size as compared to the enantiomeric ones. Recent studies suggest that stereocomplexation also occurs in the liquid phase. It is assumed that this state in the liquid phase largely affects the formation mechanism of sc-crystals.

Within this project the structure and dynamics in the liquid PLA will be measured by total scattering and small angle scattering using X-ray and neutrons, X-ray photon correlation spectroscopy, and quasielastic neutron spectroscopy. The combination of these methods will reveal changes of the chain-chain order and their ballistic mobility upon stereocomplexation, with sub-nm and pico- to microsecond resolution. The finding will contribute to the understanding on the role of backbone chirality in the polymer crystallization process.

Required qualification of the post-doc:

- PhD in physics, chemistry, materials science or relevant disciplines;
- Experience with polymer synthesis and characterization (e.g. calorimetry, infrared spectroscopy, etc.);
- Additional skills in X-ray scattering methods and/or programming are desirable.

PART B (Materials and Procedures)

The applicants shall submit the following documents to a Chinese postdoc station affiliated to a research institution or a university, after passing through the internal selection, the qualified application shall be forwarded to OCPC, and then to Helmholtz for evaluation:

- Detailed description of the interest in joining the project (motivation letter)
- Curriculum vitae, copies of degrees
- List of publications
- 2 letters of recommendation
- Proof of command of English language

PART C (General Conditions)

Additional requirements on the postdoctoral fellows:

- Chinese citizenship from Mainland China (allows application while staying abroad)
- Max. age of 35 years, PhD degree not more than 5 years by submission of application
- Very good command of English language
- Strong ability to work independently and in a team