Irish National Centre for Membrane Technology

Short-term (6 month) appointment as membrane separations researcher

Introduction

Adoption of membrane separation processes such as reverse osmosis, nano-, ultra- and microfiltration, along with pervaporation, has the potential to reduce energy and material consumption in Irish industry, saving money and protecting the environment. It is proposed to build on the existing Cork Institute of Technology (CIT) expertise in pervaporation and membrane filtration of waste streams in the pharmaceutical and fine chemicals industry in an integrated set of three research areas. The third area will be selected after an assessment of the potential applications in Irish industry. Since transfer of the technological advances into industry is essential to achieve the desired environmental benefits, a national network will be established, meeting quarterly to exchange experience and identify new opportunities. Achieving best international practice will be accomplished by establishing linkages with centres of excellence in mainland Europe.

Objective: assess the scope of application of membrane separations in Ireland

The applications of membrane processes have been well documented, but the relevance of these to Ireland remains to be quantified. An initial six month study will evaluate the existing and potential application of membrane separation processes in Ireland. This will provide a comprehensive review and inform the detailed planning of the three empirical areas to be researched.

The following tasks are required:

1. Undertake a thorough but brief desktop review of the literature. This will provide an abstract review of membrane separations. It should not repeat material that is already available, but should provide an overview and pointers to the sources for further consideration. This should identify the main sources of literature and expertise, internationally, and will be a key point of reference for the project.
2. Map the previous abstract review against the industrial and economic structure in Ireland, using published economic and environmental data. Identify existing applications. This will provide a quantitative and qualitative assessment of potential areas of application.
3. Conducted more detailed surveys on three case-study companies, e.g. streams containing metals or active pharmaceutical ingredients and solvent recovery using pervaporation. If considered feasible, a limited survey of other companies will be undertaken to validate these findings. However, past experience with industrial surveys in Ireland casts doubt on the effectiveness of such an approach in the case of technologies that are seen to be novel. Reference to industrial experts may serve to provide a better “foresight” input.
4. Identify factors that are promoting or inhibiting successful uptake of this technology through consideration of the case studies, published literature and expert opinion.
5. Review publicly available design software academic sources or from commercial vendors, e.g. GE Osmonics WINFLOWS™ membrane system design program, Dow FILMTEC™ ROSA, reverse osmosis system analysis, Hydronautics RODesign.
6. Assist in the design, development and procurement of pilot membrane plant. This plant may be represented by existing CIT plant, by plant donated by companies, or by construction and assembly of equipment.
7. Assist in the development of national and international contacts.

Scope of appointment

A short-term (6 month) appointment will be made to undertake this work package. The person will have experience of membrane separations and this might suit a visiting post-doctoral fellow or senior post-graduate student. A stipend of €2,500 per month will be paid. Office facilities will be provided in the Clean Technology Centre and the researcher will also liaise with the Department of Chemical & Process Engineering where much of the prior research work has been undertaken. The aim is to commence the appointment as soon as possible.

Further information and submission of curriculum vitae:

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