

CALL REFERENCE NUMBER : IE-09-2-2-F02-13104-1

Type of traineeship: 1 and 2

Project Title	Testing of air- and moisture-sensitive hydrogen storage materials
Project Description	<p><u>Background</u></p> <p>The traineeship offered falls under the research project "<u>Hydrogen Safe Storage and Transport (HySaST)</u>" which supports the penetration of hydrogen as alternative fuel in the energy and transportation sectors. In particular, the work proposed is experimental and will make a contribution to the solid-state hydrogen storage task. This task assesses the performance and overall potential of a number of solid materials and compounds as hydrogen storage media. The usual testing activity under this task involves sample preparation, hydrogenation and gas sorption measurements and microstructural analysis studies.</p> <p><u>The traineeship</u></p> <p>HySaST is currently consolidating its expertise in the safe handling and testing of challenging, moisture- and air-sensitive materials. A trainee is sought to assist in the optimisation of the set-up and/or the procedure followed for the handling, preparation and testing of air-sensitive (de-) hydrogenated samples.</p> <p>Any combination of the following tasks is possible:</p> <p><i>(1.) <u>Microstructural characterisation.</u></i> Techniques involved:</p> <p>(1.i) scanning and transmission electron microscopy, SEM and TEM respectively. The samples need to be protected from exposure to air during their preparation and transfer to and from the SEM/TEM sample chamber.</p> <p>The main aim is to assist in the development and refinement of the procedure, accounting for a range of materials.</p> <p>(1.ii) X-ray Diffraction - XRD. In the case of the XRD, the trainee is expected to assist in the completion of the installation, calibration and validation of a specially designed high temperature reaction chamber for an X-ray Diffraction (XRD) set-up. The latter is to be used for the identification of phases, crystal structure determination in small material quantities, and for the characterisation of in-situ hydrogenation and de-hydrogenation reactions, by means of XRD. The main aim is to refine the use and verify the operability of the apparatus, particularly for moisture and air-sensitive samples, under ultimately high pressure and high temperature conditions.</p> <p><i>(2.) <u>Hydrogen sorption measurements</u></i></p> <p>The trainee will be using state-of-the-art testing equipment, under the guidance and close supervision of experienced technical and scientific staff, for performing hydrogen sorption measurements on air-sensitive materials. This work will assist in the investigation and assessment of the targeted materials storage capacity, kinetics, thermodynamics and cycle life</p>



Qualifications/ Expertise needed	The candidate should be in preparation of a thesis for a university degree or Master's degree or PhD (as stipulated in the <u>Rules governing the Traineeship Scheme</u>) in the fields of science or engineering. The candidate should also have a strong interest in doing experimental bench work. Finally, a good working knowledge of English is required.
Duration (min. 3 months- max. 12 months)	3 to 6 months depending on the level of involvement
Location	Petten, The Netherlands
Scientific Responsible	P. Moretto / C. Filiou
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	Further information on project can be found at: <i>Institute for Energy, Action: HySaST (former SYSAF) 13104</i> <i>Web link: http://ie.jrc.ec.europa.eu/activities/SYSAF.php</i>
	Instructions on how to apply can be found at: <i>Institute for Energy http://ie.jrc.ec.europa.eu/jobs/trainees.php</i>