

Title of project/experiment/activity Use of the SEM			
Location of activity Cambridge Graphene Centre: SEM Lab		Start and end dates 08/09/2015 - continuous	
Brief description (or attach procedure/protocol) The FEI Magellan 400 HR-SEM is a self-contained Electron microscopy system, working at high vacuum (~x10 ⁻¹⁰ Pa) in the gun column and (~x10 ⁻⁷ Pa) in the sample chamber. Samples are loaded onto stubs and loaded a load lock that automatically drives the sample inside the main chamber. The electron gun runs at high Voltage (up to 30kV).			
Hazard	Effect	Control measures	Residual risk
Mechanical hazards in lab: The SEM has moving parts leading to potential pinch points.	User may trap fingers. Mechanical damage to equipment	The microscope load lock is equipped with sensors that stop the movement of the clamps in the load lock if anything is inserted during the moving (Likelihood: 1, Severity: 1).	Low risk
Electric shock	Shock to user, damage to equipment	High Voltage under operation. (Likelihood: 1, Severity: 1)	Low risk
Chemical hazard	Inhalation of nitrogen, Asphyxiation due to improper storage of liquid nitrogen.	Care with the nitrogen purge line. The handling and storage of liquid nitrogen will be covered in separated risks assessments	Low risk



Personal Protective Equipment required [<i>eye/face protection, respiratory protection, gloves, lab coat etc</i>] Face protection and cryo gloves and lab coat are used when handling liquid nitrogen at all times
Emergency Instructions & First Aid Spillage: n/a Fire: In case of fire, the fire alarm should be sounded and fire service called. If safe to do so, the fire may be extinguished



<p>using an extinguisher containing carbon dioxide, located in the corridor outside the laboratory.</p> <p>First aid: General advice: Consult a physician. Show this safety data sheet to the doctor in attendance. If inhaled: If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician. In case of skin contact: Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician. In case of eye contact: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.</p>
<p>Any special monitoring required [e.g. hearing test, vibration monitoring, health surveillance]</p> <p>No</p>
<p>Further control measures required? If yes, list with actions.</p> <p>In the case of equipment malfunction/failure: shutdown instrument from power buttons or directly from plug socket.</p>
<p>Biological/Laser/Radiation Approval [requires relevant Specialist Safety Officer signature and date]</p> <p>N/A</p>
<p>Out of hours/Lone working</p> <p>The SEM can operate out of working hours only for automatic alignment procedures and with an unattended running permit from Head of Division.</p>

Department of Engineering – Risk Assessment

Ref No.

Signature to confirm that this is a suitable and sufficient assessment of risk and that stated control measures are in place. This risk assessment should be reviewed if additional risks not covered in this assessment are identified or if there is any reason to indicate that the control measures are insufficient.

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Local Safety Coordinator	Signature 	Date 31/10/16
Departmental Safety Office IAN SLACK	Signature 	Date 9 NOV 2016