

| Title of project/experiment/activity Use of Rheometer | | | |
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| Location of activity Cambridge Graphene Centre : Ink Lab | | Start and end dates 08/09/2015 - continuous | |
| Brief description (or attach procedure/protocol) The HR-1 Discovery Hybrid Rheometer is a commercially available rheometer that will be used according to the manufacturer's guidelines. The system uses the parallel plate method, in which the upper plate is rotating while the bottom plate is stationary, to determine the rheological properties of a liquid material. The equipment is located in the Ink Lab. It is expected to be used daily. | | | |
| Hazard | Effect | Control measures | Residual risk |
| General hazards in lab | Inhalation of solvents Exposure to chemicals harmful to health | This method requires the use of small amounts of liquids (~2mL per procedure) which either can be water or organic based. Organic solvents can be toxic and consist of a chemical hazard. The mobile extractor unit extractor must be used in case of samples involving volatile solvents. Gloves and eye protection, must be worn during the process of fabrication to prevent spillages. The sample preparation using solvents and beakers of liquid should only be handled inside the extracted fume cupboard. Solvent spillage or water-based dispersion spillage should not be over 5ml, and it can be dealt by wiping with cleanroom wipes. The wipes should be disposed into waste bins. (Likelihood: 1, Severity: 1) | Low risk |
| Rotating top and heated bottom (up to 200°C) plates | Possible injury from the moving plate Or risk of burn from the bottom plate. | Keep hands, clothes and other objects away from the moving/heated parts of the Rheometer. If attention is given to the moving and heated parts, gloves and safety glasses are worn and a fume extractor is used when using hazardous solvents the outcome would be a minor inconvenience. (Likelihood: 1, Severity: 1) | Low risk |
| Electric shock | Shock to user, damage to equipment | Do not get outer parts of Rheometer wet. Clean up any spillages immediately. (Likelihood: 1, Severity: 1) | Low risk |

Personal Protective Equipment required *[eye/face protection, respiratory protection, gloves, lab coat etc]*

Lab coat, gloves (purple nitrile) and eye protection (safety specs) required in the lab at all times

Emergency Instructions & First Aid

Spillage:

Solvent spillage or water-based dispersion spillages can be dealt by wiping with wipes. The wipes disposed into waste bins or should be left to dry (in the case of solvent spillage) in the solvent fume cupboard prior to disposal into waste bins.

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 using an extinguisher containing carbon dioxide, located in the corridor outside the laboratory.

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.

Any special monitoring required *[e.g. hearing test, vibration monitoring, health surveillance]*

No

Further control measures required? If yes, list with actions.

Waste Disposal Procedures: Aqueous waste should be disposed in a container separate from solvent waste.

Solvents will be disposed of in suitable chlorinated (e.g. DCB, chloroform), or non-chlorinated (all others) waste containers.

In the case of equipment malfunction/failure: shutdown instrument and chiller from power buttons or directly from plug socket.

Biological/Laser/Radiation Approval *[requires relevant Specialist Safety Officer signature and date]*

N/A



Out of hours/Lone working


Rheometers can only be used during working hours.

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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| Name of Supervisor Prof A.C. Ferrari Email: acf26@cam.ac.uk | Signature  | Date 2/9/16 |

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|--|---|---------------------------|
| Local Safety Coordinator | Signature David Hule | Date 2/11/16 |
| Departmental Safety Office IAN SLACK | Signature  | Date 9 NOV 2016 |