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| **DIAMOND LABORATORY****SCHOOL OF CHEMISTRY, UNIVERSITY OF BRISTOL****RISK ASSESSMENT**  |
| **Name:**  | **Date:**  |
| **Activity being assessed:** **Thermionic Emission Kit** |
| **Summary**: Laser heated test rig that heats a sample to up to 1000 oC under vacuum (10-6 torr) using a CO2 laser (10.6 m), with bias on the order of 25 V.**Equipment Hazards:**Laser pathway diversion and risk of overheating or creation of hotspotsLaser power failureInternal motor malfunction and overheating due to heat conduction from sampleVacuum leakage leading to air exposure to high temperature in chamberShort-circuit inside the chamber that may lead to severe damage of the electrical connections**Procedure Hazards:**Removal of top flange (heavy), which supports the sample stage and electrical circuit (potentially damaged). |
| **Measure to be taken to reduce the level of risk:****Equipment:**Check that the turbo-pump can effectively evacuate the system easily to 10-5 torr, and 10-6 torr overnightDon’t use shiny equipment or wear jewellery when aligning or switching the laser on or offMake sure the laser pathway is below normal eye levelHeat the sample with low power to 250 – 300 oC, and check that only ~ 10 % laser power is needed, otherwise it may be blockedCheck the connection of all electrical components and make sure they aren’t in contact with each other, before inserting top flange, and again whilst pumping down The risk of injury due to laser light is low under ordinary circumstances, provided that safe working practices (including proper laser safety precautions) are followed. If this is not done and an accident occurs, the result could be serious eye injury, up to and including permanent blindness. Skin injuries are likely to be minor, but the potential for DNA damage and subsequent serious complications such as melanoma should not be neglected. Class 4 lasers are by definition a fire hazard, but the probability and likely severity of any fire is minimal since the beam is normally enclosed and not directed toward flammable objects under any foreseeable circumstances. See the reference on Laser work in laboratories and refer to training. **Procedures:**Take care when lifting the top flange. Lift straight up and never twist when resting it on o-ring. If needed ask for help (not a problem!). |
| **Action to be taken in an emergency:**If any of the above measures fail to avoid a problem, then do not proceed with the experiment – follow shut-down procedure until the point when the problem can be fixed. If all fails, inform a responsible person (Drs Ramiz Zulkharnay and James Smith).**Emergency procedure for chamber overheating:**Turn off laser power by closing shutter and switching off laser. Turn off bias. Inform responsible person |
| **References if any:**School of chemistry Risk assessment on Laser Work in Laboratories |
| **Signature:****Approved by (sign, initial & date):**  |