



CS CoP009 - Substances of particular concern

009.1 Toxic Substances

All experiments involving toxic reagents, their products and by-products, particularly when these are gaseous or volatile, should be carried out only in an efficient fume cupboard, or glove box so as not to endanger other nearby workers. If an efficient fume cupboard is not available, the experiment should not be carried out. Where work with very toxic chemicals, mutagens or teratogens is being planned, it is a requirement that the School Safety Adviser is informed and other workers in the same laboratory notified of the dangers.

009.2 Flammable Reagents and Solvents

For persons experienced in the laboratory techniques of distillation, solvent extraction and solvent evaporation, a limited batch size of 2.5 litres of flammable solvents is suggested; less experienced workers are recommended to use appreciably smaller batches. Precautions must be taken to minimise the concentration of flammable vapour in the working area and to eliminate all sources of ignition, such as sparking thermostat controllers, etc. Thought must be given, before starting a process, as to the action required should there be an accident with flammable solvents leading to a fire.

Dialkyl ethers and tetrahydrofuran form peroxides in contact with air or exposure to sunlight; the distillation to near dryness of a peroxidised solvent can lead to detonation. Any peroxides present must always be removed prior to distillation.

Solvent residues and other combustible materials must not be allowed to accumulate in laboratories. Flammable reagents and solvents must never be poured down drains, but must be collected and arrangements made for their safe disposal via the School of Chemistry's Waste Disposal Service. Waste acetone and chloroform must not be mixed, since the mixture can lead to an exothermic reaction.

009.3 Highly Reactive Chemicals and Explosive Reactions

Certain highly reactive chemicals, such as acetylides, azides, diazoalkanes, nitrogen halides, perchlorates, peroxides and polynitro-compounds often behave unpredictably and are prone to decompose explosively. Reactions involving these, and other like materials must therefore only be undertaken by, or under the close supervision of, experienced and cautious investigators who are fully conversant with the relevant literature. A careful appraisal must always be made of the proposed operating conditions and techniques and the batch size must be strictly limited.

Wherever there is the possibility of an explosive atmosphere being generated the requirements of the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) must be addressed before commencement of the activity. [Guidance and risk assessment forms pertaining to DSEAR](#) can be downloaded online.



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Protection must be provided against the hazards of explosion, rupture of apparatus from overpressure, sprays or emission of toxic or corrosive materials and flash ignition of vented vapours or gases. Apparatus must be placed so that no-one can be injured if an explosion occurs. Operation within an appropriate fume cupboard is always recommended with the additional protection of a safety screen, which is either fixed or weighted so that it does not become a missile itself during an explosion. If a safety screen is used to protect against an explosion risk during work on the open bench, place the apparatus and the screen so that no-one in the area is at risk from flying debris.

Document version

Version number	Summary of change	Date and by whom
V1.0	New template	06/06/2023 HE

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