Incompatible Chemicals from Prudent Practices in the Laboratory: Handling and Disposal of Chemicals

Chemicals	Incompatibilities
Acetic acid	Chromic acid, nitric acid, peroxides, permanganates
Acetic anhydride	Hydroxyl-containing compounds such as ethylene glycol, perchloric acid
Acetone	Concentrated nitric and sulfuric acid mixtures, hydrogen peroxide
Acetylene	Chlorine, bromine, copper, silver, fluorine, mercury
Alkali and alkaline earth metals, such as sodium, potassium, lithium, magnesium, calcium, powdered aluminum	Carbon dioxide, carbon tetrachloride, other chlorinated hydrocarbons (also prohibit the use of water, foam, and dry chemical extinguishers on fires involving these metals—dry sand should be employed)
Ammonia (anhydrous)	Mercury, chlorine, calcium hypochlorite, iodine, bromine, hydrogen fluoride
Ammonium nitrate	Acids, metal powders, flammable liquids, chlorates, nitrites, sulfur, finely divided organics, combustibles
Aniline	Nitric acid, hydrogen peroxide
Bromine	Ammonia, acetylene, butadiene, butane, other petroleum gases, sodium carbide, turpentine, benzene, finely divided metals
Calcium oxide	Water
Carbon, activated	Calcium hypochlorite, other oxidants
Chlorates	Ammonium salts, acids, metal powders, sulfur, finely divided organics, combustibles
Chromic acid and chromium trioxide	Acetic acid, naphthalene, camphor, glycerol, turpentine, alcohol, other flammable liquids
Chlorine	Ammonia, acetylene, butadiene, butane, other petroleum gases, hydrogen, sodium carbide, turpentine, benzene, finely divided metals
Chlorine dioxide	Ammonia, methane, phosphine, hydrogen sulfide
Copper	Acetylene, hydrogen peroxide
Dimethyl sulfoxide (DMSO)	Active halogenated compounds (i.e. acyl chlorides) and active metal hydrides
Fluorine	Isolate from everything
Hydrazine	Hydrogen peroxide, nitric acid, any other oxidant
Hydrocarbons (benzene, butane, propane, gasoline, turpentine, etc.)	Fluorine, chlorine, bromine, chromic acid, peroxides
Hydrocyanic acid	Nitric acid, alkalis
Hydrofluoric acid (anhydrous)	Ammonia (aqueous or anhydrous) Hydrogen fluoride
Hydrogen peroxide	Copper, chromium, iron, most metals or their salts, any flammable liquid, combustible materials, aniline, nitromethane
Hydrogen sulfide	Fuming nitric acid,[a] oxidizing gases
Iodine	Acetylene, ammonia (anhydrous or aqueous)
Mercury	Acetylene, fulminic acid,a ammonia
Nitric acid (concentrated)	Acetic acid, acetone, alcohol, aniline, chromic acid, hydrocyanic acid, hydrogen sulfide, flammable liquids, flammable gases, nitratable substances

Chemicals	Incompatibilities
Nitroparaffins	Inorganic bases, amines
Oxalic acid	Silver and mercury and their salts
Oxygen	Oils, grease, hydrogen, flammable liquids, solids, gases
Perchloric acid	Acetic anhydride, bismuth and its alloys, alcohol, paper, wood, grease, oils (all organics)
Permanganates	Sulfuric acid
Peroxides, inorganic	When mixed with combustible materials, barium, sodium, and potassium peroxides for explosives that ignite easily.
Peroxides, organic	Acids (organic or mineral), (also avoid friction, store cold)
Phosphorus (white)	Air, oxygen
Phosphorus (white and red)	Forms explosive mixtures with oxidizing agents
Phosphorus pentoxide	Alcohols, strong bases, water
Potassium chlorate	Acids (see also chlorates)
Potassium perchlorate	Acids (see also perchloric acid)
Potassium permanganate	Glycerol, ethylene glycol, benzaldehyde, sulfuric acid
Silver and silver salts	Acetylene, oxalic acid, tartaric acid, fulminic acid,[a] ammonium compounds
Sodium	See alkali metals (above)
Sodium Amide	Air
Sodium nitrite	Ammonium nitrate and other ammonium salts
Sodium peroxide	Any oxidizable substance, such as ethanol, methanol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerol, ethylene glycol, ethyl acetate, methyl acetate, furfural
Sulfuric acid	Chlorates, perchlorates, permanganates

Table 3.9 from Prudent Practices in the Laboratory: Handling and Disposal of Chemicals.
*Note: Some of the items on this table were added from section 5.G.6.

The on-line version of this book can be located at
http://www.nap.edu/books/0309052297/html

*Note: This table is not intended to be exhaustive lists.

TABLE 3.10 Classes of Incompatible Chemicals

A incompatible with	B
Alkali and alkaline earth Carbides Hydrides Hydroxides Metals Oxides Peroxides	Water Acids Halogenated organic compounds Halogenating agents Oxidizing agents[a]
Azides, inorganic	Acids Heavy metals and their salts Oxidizing agents[a]
Cyanides, inorganic	Acids Strong bases
Nitrates, inorganic	Acids Reducing agents[a]
Nitrites, inorganic	Acids Oxidizing agents[a]
Organic compounds	Oxidizing agents[a]
Organic acyl halides	Bases Organic hydroxy and amino compounds
Organic anhydrides	Bases Organic hydroxy and amino compounds
Organic halogen compounds	Group IA and IIA metals Aluminum
Organic nitro compounds	Strong bases
Oxidizing agents[a] Chlorates Chromates Chromium trioxide Dichromates Halogens Halogenating agents Hydrogen peroxide Nitric acid Nitrates Perchlorates Peroxides Permanganates Persulfates	Reducing agents[a] Ammonia, anhydrous and aqueous Carbon Metals Metal hydrides Nitrites Organic compounds Phosphorus Silicon Sulfur
Reducing agents[a]	Oxidizing agents[a] Arsenates Arsenites Phosphorus Selenites Selenates Tellurium salts and oxides
Sulfides, inorganic	Acids

[a]The examples of oxidizing and reducing agents are illustrative of common laboratory chemicals; they are not intended to be exhaustive.