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Standard Operating Procedure

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: 4/28/10

SOP Title: Safe Use of Acid Solutions

Principal Investigator:

Room and Building:

Lab Phone Number:

Section 1 – Process

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| Mixing various concentrations of aqueous acid solutions.  Heat is released when strong acids are mixed with water. If you add water to acid, you form an extremely concentrated solution of acid initially and the solution may boil very violently, splashing concentrated acid. If you add acid to water, the solution that forms is very dilute and the small amount of heat released is not enough to vaporize and spatter it.  **Always Add Acid to water, and never the reverse** |

Section 2 – Hazardous Chemicals

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| Acids - nitric, sulfuric, hydrochloric, acetic, phosphoric, perchloric, formic, trichloroacetic, glacial  acetic, |

Section 3 – Potential Hazards

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| Skin tissue destruction (burn), eye tissue destruction from fumes or splash |

Section 4 – Approvals Required

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| None. |

Section 5 – Designated Area

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| Concentrated acids are to be used in a fume hood with eye-wash and safety shower close by. Adjust fume hood sash to serve as a splash shield. Make sure there is plenty of room and always work more than 6 inches inside the fume hood. |

Section 6 – Special Handling Procedures and Storage Requirements

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| Store mineral acids together, separate from oxidizing agents and organic materials. Store containers of acids and bases separately in chemical resistant secondary containers. This could be a polyethylene, PYREX or Nalgene tray or pan.  Bottles of acid should be stored in an acid (corrosive) cabinet. While acids and bases are both considered to be corrosive, care must be taken to not store acids and bases in the same cabinet. It is particularly important to avoid storing ammonium hydroxide and strong mineral acids in the same cabinet.  Oxidizing acids, such as fuming nitric, fuming sulfuric and nitric should be stored separately, in a secondary container within an acid cabinet.  Glacial acetic acid, although it is both a corrosive and flammable, should be stored with other, non-oxidizing acids segregated away from those mentioned above, not in a flammables cabinet.  For more information specific to the acid review a MSDS. Also review the Corrosive fact sheet available at EH&S web site http://ehs.berkeley.edu/. |

Section 7 – Personal Protective Equipment

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| **Safety goggles**: Wear safety glasses or chemical safety goggles with face shield when using large quantities, or chemical safety goggles when using small quantities  **Gloves**: (nitrile, PVC, or neoprene provides adequate protection). Avoid skin contact, serious burns may result.  **Apron:** Wear rubber, neoprene, or PVC apron when using large quantities and splash potential exists.  **Lab coat** when using small quantities.  **Close-toed shoes** and **long pants** are required for all laboratory work. |

Section 8 – Engineering/Ventilation Controls

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| Use concentrated acids in fume hood. A safety shower and eyewash must be available and accessible when working with corrosive liquids. Test the eyewash to know that it is working and has recently been flushed. |

Section 9 – Spill and Accident Procedures

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| **Skin exposure:** Rinse affected skin with plenty of water while removing contaminated clothing and shoes. Rinse for at least 15 minutes. Seek medical attention.  **Eye exposure:** Splashes may cause tissue destruction. Wash eyes for at least 15 minutes in eye/face wash, lifting the upper and lower eyelids occasionally (ask for assistance). Seek medical attention immediately.  **Small spills:** Do not attempt cleanup if you feel unsure of your ability to do so or if you perceive the risk to be greater than normal laboratory operations. Cover spill with sodium carbonate or bicarbonate. When reaction stops, pickup with damp sponge or paper towels (wearing PPE). Nearest spill cart is located in room \_\_\_\_\_. Test liquid with pH paper.  **Large Spills:** Notify others in area of spill. Turn off ignition sources in area. Evacuate area and post doors to spill area. Call EH&S:  Office of Environmental Health & Safety 510-642-3073, University Police 911  Remain on the scene, but at a safe distance, to receive and direct safety personnel when they arrive.  Restrict persons from area of spill or leak until cleanup is complete. Remain in area in safe location  to assist EH&S with response. |

Section 10 – Waste Disposal

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| Dispose of acid waste through EH&S.  Many times, the weak acids you are working with can be neutralized through titration with an appropriate  base and then disposed of down the drain. Please check drain disposal guidelines for allowable  chemicals and quantities. <http://www.ehs.berkeley.edu/pubs/guidelines/draindisposal.pdf> . The pH of the solution must be between pH5-10. |

Section 11 - Decontamination

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| Use sodium bicarbonate and water. Final wash with soap, maybe test with pH paper. |

Training Documentation

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