Filling the NMR with liquid nitrogen

Department: Chemistry & Chemical Biology
Date SOP was written: July 1, 2014
Date SOP was approved by PI/lab supervisor: Andy LiWang
Reviewed by: Andy LiWang
Principal Investigator: Andy LiWang
Internal Lab Safety Coordinator/Lab Manager:
Lab Phone: 209.228.4630
Office Phone: 209.228.4631
Emergency Contact: Karen Smith
209.205.8176

Location(s) covered by this SOP: Castle 1201
Suite 920

Type of SOP:  X Process  □ Hazardous Chemical  □ Hazardous Class

Purpose

This SOP covers filling the 600 MHz NMR spectrometer with liquid N₂
Summary of Significant Health and Physical Hazards

- The magnet is very strong and can affect metal implants, and pacemakers.
- In the event of a quench of the superconducting magnet, oxygen in the room can be reduced to dangerously low levels.
- Liquid N$_2$ is dangerously cold (77 K; -196 °C; -321 F). Thus, insulating gloves, lab coat, and eye protection are required when filling the magnet with liquid N$_2$.

Risk Assessment

The overall health and safety risk for use of this spectrometer in accordance with the procedure and protocol in the following section is considered LOW based on:

- Serious injury from exposure to liquid nitrogen is low for this procedure.

Protocol/Procedure

1. Don gloves, lab coat, and eye protection.
2. Proceed with the fill only if there is no NMR experiment running.
3. Roll the liquid N$_2$ dewar to the magnet. Do not bang the dewar against the magnet! Doing so could cause severe damage to the magnet.
4. Purge the transfer line of air by opening the valve for a few seconds.
5. Carefully remove the thermal fins from the N$_2$ ports and set them stably on top of the magnet.
6. Connect the line to an N$_2$ port on the top of the magnet. Do not lean on the magnet! Use the ladder to reach the top of the magnet.
7. Connect a short piece of tubing to the other N$_2$ port and point it away from electronics and other spectrometer components.
8. Slowly open the valve to the dewar just slightly. Allow the transfer line to freeze before opening the valve further.
9. While transferring liquid N$_2$ to the magnet, you must stay in the magnet room until the fill is finished.
10. When liquid N$_2$ starts coming out of the open N$_2$ port, shut the valve immediately.
11. Carefully remove the tubing from the N₂ ports on the magnet and quickly replace the thermal fins.

12. Check the fluid level in the chiller, which sits outside in back of building 1201.

13. Record the date of the N₂ fill and chiller fluid level in the log book.

In the unlikely event of a magnet quench, there will be a massive and rapid jettison of helium gas from the top of the magnet. It is vital that you evacuate the magnet room and laboratory as quickly as possible and call Environmental Health and Safety at 209.228.4261.
Documentation of Training (signature of all users is required)

- Prior to conducting any work with the chemicals listed above, designated personnel must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.

- The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and a copy of the SDS provided by the manufacturer.

- The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training within the last one year.

I have read and understand the content, requirements, and responsibilities of this SOP:

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